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WORLD HEALTH ORGANIZATION

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THE WORK OF WHO IN 1959

During 1959, WHO took part in more than 500 health projects in some 140 countries and territories, alone or in co-operation with other agencies. In addition to this direct help, the Organization provided international technical services in such fields as medical research, atomic energy in relation to health, biological standardization, pharmacology, and health statistics. In his latest annual report,[1] Dr. M. G. Candau, Director-General of WHO, refers to the general background against which this work was carried out: a background of reduced tension in international affairs, of substantial improvement in economic conditions throughout the world, particularly in Europe, and of growing evidence of the determination of world leaders to devote more of their countries' resources to raising the living standards of nations that are still in the early stages of technological and economic development.

The world-wide malaria eradication campaign remained in the forefront of the Organization's activities:

"In December 1959 about 568 million people were being protected by operations which had reached the attack or consolidation phase, while preparatory or pre-eradication survey work was being undertaken for an area inhabited by about 168 million people. Eradication work was extended to the whole of India, the largest malarious country in the world. The second largest, Indonesia, has begun the implementation of a programme which was recently drawn up. While in the third largest, Pakistan, a pre-eradication survey was initiated, the fourth, Brazil, started a country-wide eradication project to be carried out in stages and using chloroquinized salt as the main weapon in the most difficult area of the country, i.e., the Amazon Valley. Moreover, most of the countries which were already engaged on eradication work have concentrated during the year on improving operations wherever necessary. The concern of all regional committees for the objective of eradication is exemplified by the resolution adopted by the Regional Committee for Europe which provides for a co-ordinated plan designed to bring eradication programmes to the consolidation phase in 1962 in all the remaining malarious areas of continental Europe."

Despite the relatively short period—three years—during which the world-wide malaria eradication programme has been in operation, more knowledge has been accumulated in this health field than in any other, and the programmes in operation cover all the continental malarious countries of the Americas, Europe, and South-East Asia. The following list shows the programmes in operation in these and other regions last year:

COUNTRIES AND TERRITORIES IN WHICH MALARIA PROGRAMMES WERE IN OPERATION IN 1959

African Region

Eradication in Progress

Mauritius
Réunion
Swaziland
Union of South Africa
Zanzibar and Pemba

Pre-eradication Survey

British Somaliland
Togo [a]

Pilot Project

Cameroons [a]
Republic of Dahomey
Ghana
Liberia
Nigeria
Republic of Senegal
Southern Rhodesia
Uganda
Republic of the Upper Volta

[1] World Health Organization (1960) *The work of WHO 1959: Annual report of the Director-General to the World Health Assembly and to the United Nations* (*Off. Rec. Wld Hlth Org.*, No. 98), Geneva, x+283 pages. Price: 10/—, $2.00, or Sw. fr. 6.—. Published in English, French and Spanish.

[a] Trusteeship under French administration during period under review

Region of the Americas

Eradication in Progress

Argentina
Bolivia
Brazil
British Guiana
British Honduras
Colombia
Costa Rica
Dominica
Dominican Republic
Ecuador
El Salvador
French Guiana
Grenada
Guadeloupe
Guatemala
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
St Lucia
Surinam
Trinidad and Tobago
Venezuela

Pre-eradication Survey

Cuba

South-East Asia Region

Eradication in Progress

Afghanistan
Burma
Ceylon
India
Indonesia
Portuguese India
Thailand

Pre-eradication Survey

Nepal

European Region

Eradication in Progress

Albania
Bulgaria
France (Algeria)
Greece
Portugal
Romania
Spain
Turkey
Union of Soviet Socialist Republics
Yugoslavia

Eastern Mediterranean Region

Eradication in Progress

Iran
Iraq
Israel
Jordan
Lebanon
United Arab Republic: Syria

Pre-eradication Survey

Libya
Pakistan
Saudi Arabia
Tunisia
United Arab Republic: Egypt

Pilot Project

Ethiopia
Somalia
Sudan

Western Pacific Region

Eradication in Progress

Cambodia
Laos
Philippines
Ryukyu Islands
Sarawak
Taiwan
Republic of Viet Nam

Pre-eradication Survey

Republic of Korea

Pilot Project

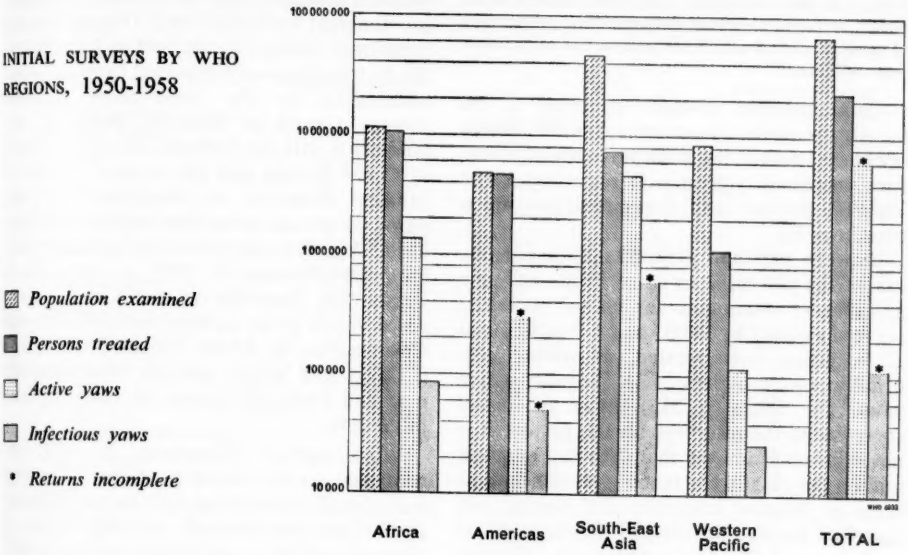
Netherlands New Guinea
North Borneo

Following the approval by the Twelfth World Health Assembly of a plan for the expansion and intensification of WHO's work in the field of international medical research, an Advisory Committee on Medical Research met in Geneva in the autumn of 1959 to provide the Director-General with guidance on future research activities. While international medical research must still concentrate on the communicable diseases, with particular reference to virus and tropical diseases, the first objectives in the highly industrialized countries are the chronic diseases and particularly cancer and cardiovascular troubles. Because of the rapidly expanding use of fissionable materials for peaceful needs, medical research must be concerned with the increased risk of human exposure to ionizing radiations, as well as with the possible genetic effects of radiations. As regards the type of research to be undertaken, priority will go to " service to research " such as standardization of nomenclatures, techniques and equipment, and the expansion of the WHO system of international reference centres for the identification of certain types of virus and of malignant tumours:

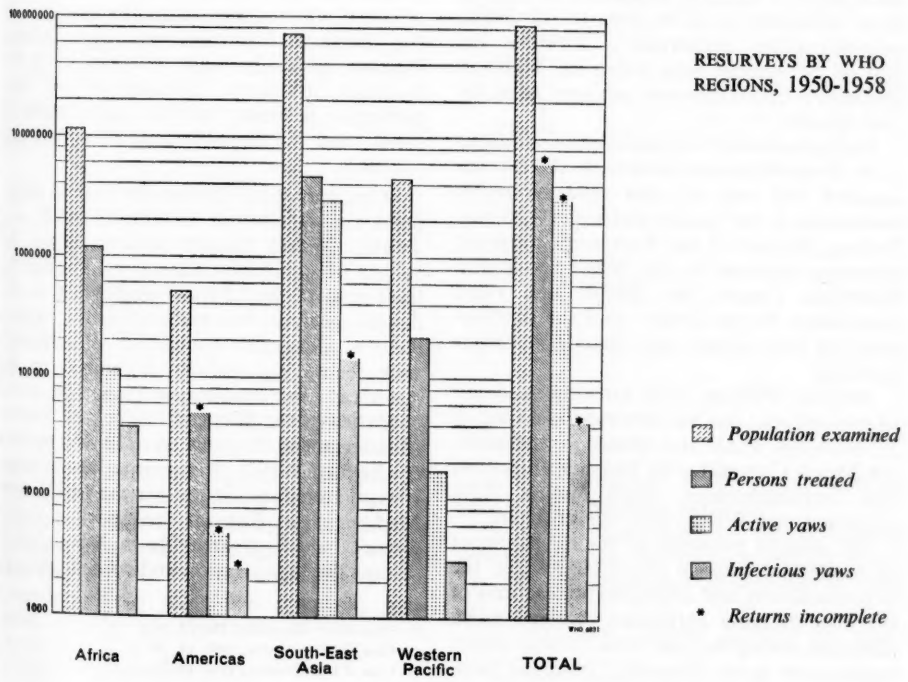
" In evaluating the progress made by WHO in this particular field, one has to keep in mind the fact that the world-wide medical research programme under intergovernmental auspices is a development for which there is no precedent. Useful as some of the established patterns of central research organization have proved in this respect, it has also been found that many are not easily applicable to the international scene. Therefore, in addition to building up the scientific programme, we had to develop the necessary organizational framework and administrative patterns

YAWS ERADICATION WORK

INITIAL SURVEYS BY WHO REGIONS, 1950-1958



RESURVEYS BY WHO REGIONS, 1950-1958



for this new undertaking. By the end of 1959 all this work had been completed and WHO seemed sufficiently prepared to launch the intensified programme of medical research which has become one of its major responsibilities."

Communicable diseases continue to be among the world's most serious public health problems, and in the great majority of countries increased vigilance is necessary. The venereal diseases and treponematoses are a case in point.

Between 1950 and 1958, 65 million persons out of the 100 millions or so in the endemic areas were examined for yaws in initial surveys assisted by WHO and UNICEF, and 22.5 million were treated, of whom over 6 million were patients with clinically active yaws. The figure (p. 215) shows the initial surveys and the resurveys for this period. It is nevertheless estimated that " over a hundred million people still live in low-prevalence yaws areas in tropical countries and studies will therefore have to be made of the problems of such areas if effective assistance in fighting these infections is to be given to the health administrations concerned ". Towards the end of 1959 steps were taken by WHO to establish a treponematoses advisory team for such studies.

Recrudescence of venereal syphilis continues to be observed in some countries, and this has justified the trial of new epidemiological methods (e.g., the "cluster technique") for case finding, the use of the fluorescent antibody technique (devised by the WHO Serological Reference Centre) for specific and rapid recognition of the disease, and the development of new serum tests based on finger-pricking.

Another problem is the growing incidence of gonorrhoea; this was observed in 15 out of 22 countries where the disease is notifiable. An Expert Committee on Venereal Infections and Treponematoses, which met in 1959, suggested that WHO study this problem.

The general problems of the development of bacterial resistance to antibiotics and the hypersensitivity and anaphylactic reactions of the host to these antibiotics received much attention during the year from various expert bodies such as the Scientific Group on Antibiotics Research, the Advisory Committee on Medical Research, and the Expert Committee on Venereal Infections and Treponematoses mentioned above. In the field of tuberculosis the first findings were reported from the study undertaken by the Tuberculosis Chemotherapy Centre of Madras, India, in collaboration with the Medical Research Council of Great Britain and the Indian Council of Medical Research, on domiciliary as compared with sanatorium treatment of tuberculosis.[2] Leprosy control was the subject of three important meetings in 1959: a conference in Brazzaville, Republic of the Congo, sponsored jointly by the Commission for Technical Co-operation in Africa South of the Sahara (CCTA) and WHO,[3] and an expert committee [4] and a scientific group on research, both in Geneva.

Work against bilharziasis in 1959 concentrated on two major problems. A survey was started to determine how far the efficiency of molluscicides depends on such factors as climate, sunlight, topography and the quality of water, while a team visited ten countries in the Eastern Mediterranean and African Regions to study ways of preventing bilharziasis in newly irrigated areas, with particular reference to the construction of canals and the improvement of agricultural practices.

Steps were taken during the year to implement the resolutions of the Eleventh and Twelfth World Health Assemblies on the subject of smallpox eradication. Though the final goal of world-wide eradication is still distant, progress was made towards its attainment in all regions concerned. Programmes were being successfully organized in the Americas, and eradication plans for several countries in the Western Pacific and Eastern Mediterranean Regions were drawn up with the help of WHO. Representatives of countries and territories in the African and Eastern Mediterranean Regions took part in a conference held in Brazzaville in November to discuss the organization and co-ordination of

[2] See *WHO Chronicle*, 1959, 13, 397.
[3] See *WHO Chronicle*, 1960, 14, 18.
[4] See *WHO Chronicle*, 1960, 14, 21.

PROFESSORS ASSIGNED TO MEDICAL, PUBLIC HEALTH AND OTHER SCHOOLS IN 1959

BY SUBJECT

	Professors	Months
In medical, public health and nursing schools		
Anatomy	2	20
Biology	1	12
Environmental sanitation	16	141
Health education	1	12
Internal medicine	1	4
Medical physics	1	4
Mental health	1	4
Nursing	73	725
Nutrition	1	3
Obstetrics and gynaecology	1	3
Ophthalmology	1	8
Paediatrics	2	10
Pharmacology	1	12
Physiology	3	26
Preventive and social medicine	6	26
Public health	1	12
Radiology	1	2
Social and occupational health	7	55
Surgery	1	1
In other educational institutions		
Auxiliary personnel	8	78
	129	1158

BY COUNTRY

	Professors	Months
Afghanistan	8	73
British Solomon Islands	1	3
Burma	2	14
Cambodia	7	56
Ceylon	5	31
China	4	37
Cyprus	1	12
Ethiopia	4	48
Fiji	2	24
India	19	174
Indonesia	5	53
Iran	8	79
Iraq	1	12
Israel	4	39
Lebanon	1	1
Libya	5	54
Nepal	5	60
Nigeria	3	10
Pakistan	4	30
Philippines	3	19
Singapore	4	45
Somalia	2	16
Sudan	6	67
Thailand	5	38
United Arab Republic	15	112
Viet Nam	4	39
Zanzibar	1	12
	129	1158

smallpox eradication campaigns in Africa.[5] The goal of world-wide eradication should be greatly advanced by the all-India eradication campaigns, for which recommendations were drawn up in 1959. The assistance given by the Organization to individual countries consisted mainly of guidance on choice of vaccine, techniques of preparing it, and training of laboratory personnel.

In the field of poliomyelitis, the outstanding development was the growing interest in live vaccines and increased experience of their use.[6]

In veterinary public health, the chief

[5] See *WHO Chronicle*, 1960, **14**, 82.

[6] See *WHO Chronicle*, 1960, **14**, 137, 142.

emphasis is still on the control of zoonoses and problems of food hygiene. In the last month of 1959 a scientific group on brucellosis met in Geneva and established plans for field trials in man of live vaccines prepared from attenuated strains of *Brucella*, in countries where the disease is endemic. A world-wide survey of the incidence of rabies was undertaken so that the reporting system might be improved, the effect of measures adopted against the disease studied, and preventive treatment given to persons exposed to bites from animals likely to be infected. WHO is also co-ordinating work for the improvement of vaccines for human and veterinary use and for more effective laboratory procedures for the diagnosis and study of the rabies virus. A significant new development in the field of zoonoses has been the initiation of comparative studies on animal diseases analogous to cancer and cardiovascular disease in man.

In 1959, as in previous years, high priority was given to the education and training of personnel. The demand for more and better-trained health workers is everywhere greater than the supply. " One of the promising signs for the future," writes Dr Candau in the introduction to the report, " is the fact that in 1959 the number of fellowships granted under the aegis of WHO reached the ten thousand mark. Those who have received these fellowships are the living sources from which the public health leaders and scientists of tomorrow are drawn." The total number of fellowships awarded by the Organization between 1 December 1958 and 30 November 1959 was 1431. Of these, 56% went to physicians, 12% to nurses and midwives, 7% to sanitarians, and 25% to other health personnel.

The average period of study abroad was 5.6 months. Of the fellows, 22% attended courses organized or assisted by WHO, 27% were admitted to other courses in academic institutions, and 51% spent a period of practical training and observation abroad. The average age of the fellows was 37 years. Most of them came from various health services, but 18% were on the staff of teaching institutions and 6% came from institutions primarily concerned with research. A further 5% of the fellows were young people studying abroad for basic professional qualifications for which no training facilities existed in their countries.

Fellows came from 112 countries and visited 89 countries. The major countries of study, i.e., those receiving more than 5% of the fellows, were: the United Kingdom, the United States of America, France, Denmark, Sweden, India, the Netherlands, and the United Arab Republic (Province of Egypt). Of the fellowships awarded, 60% were for the study of public health organization and health promotion, 22% for the study of communicable diseases, and 18% for basic medical sciences and education.

WHO also continued to assign professors to medical, public health, and other educational institutions, one of their duties being to prepare local staff to carry on their teaching functions at the end of their assignments. In 1959, a total of 1158 months was served by 129 teachers in 19 disciplines in 27 countries (see table on page 217).

Other activities on which the Organization laid special emphasis in 1959 include the community water supply programme that was approved by the Twelfth World Health Assembly, research in insecticide resistance, the development of new pesticides, and the prevention and treatment of protein malnutrition.

The report contains separate chapters on work in the different regions and a list of country, inter-country and inter-regional health projects helped by the Organization between 1 December 1958 and 30 November 1959.

AVIATION HYGIENE AND SANITATION

Attempts to limit the international spread of disease have a long history. In the nineteenth century many international sanitary conventions were signed, but as each had a specific objective, none of them replaced its predecessor or any other previous convention.[1] Just after the Second World War, there were 13 such conventions and agreements in force at the same time, the result inevitably being diplomatic and procedural confusion, shipping difficulties and delays.

Article 21 of WHO's Constitution provides that the World Health Assembly should have "the authority to adopt regulations concerning . . . sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease" and in due course the International Sanitary Regulations were drafted, to be adopted by the Fourth World Health Assembly in 1951 and generally accepted.[2] Their aim is to ensure the maximum security against the international spread of diseases with the minimum interference with world traffic. Specifically they are directed against six quarantinable diseases—plague, cholera, yellow fever, smallpox, typhus, and relapsing fever—and the Tenth World Health Assembly[3] made it clear that they refer expressly to those diseases, and place limits on the sanitary measures to be taken in respect of other infectious diseases.

General provisions in the International Sanitary Regulations require health administrations *inter alia* to ensure as far as practicable that airports in their territories have at their disposal sufficient organization and equipment for the application of the Regulations; and are provided with supplies of pure drinking-water and effective systems for the removal and safe disposal of excrement, refuse, waste water, condemned food, and other matter dangerous to health. Certain airports (designated as sanitary airports) should also be equipped with an organized medical service and facilities to combat infection. There are no specific provisions, however, on such matters as how pure drinking-water is to be supplied or an effective waste-disposal system organized, health administrations being left to make their own arrangements.

From the point of view of airport authorities, therefore, the International Sanitary Regulations applied expressly to only six diseases, and they contained general, but not detailed, provisions. In 1950 the International Air Transport Association called the attention of WHO to the need for improved airport sanitation for the protection of crews and passengers against other diseases that might impair the efficiency of the crews and endanger the safety of the aircraft. This need was acknowledged by the Fourth World Health Assembly,[4] which, in a general review of public health problems of air travel, enunciated certain principles that it felt to be generally applicable. The health of air crews should be protected at all airports en route. An aircraft cannot with safety take off from any airport unless every member of the flight crew is physically fit. Consequently, control should not stop short at the six diseases dealt with in the International Sanitary Regulations, but should include other diseases such as dysentery, food poisoning, gastro-enteritis, and malaria. High standards of hygiene and sanitation should be applied at all international airports and direct transit areas, at least on the main trunk routes. The Assembly outlined several measures that should be taken, in conjunction with the International Civil Aviation

[1] Gear, H. S. & Deutschman, Z. (1956) *Disease control and international travel*, World Health Organization, Geneva

[2] World Health Organization (1957) *International sanitary regulations*, Geneva

[3] *Off. Rec. Wld Hlth Org.*, 1957, **79**, 26

[4] *Off. Rec. Wld Hlth Org.*, 1952, **35**

Organization, to assist Member States in dealing with the problem. Among them was the preparation of a guide to hygiene and sanitation in the operation of airports open to international traffic.

This guide was prepared by a WHO Expert Committee on Hygiene and Sanitation in Aviation,[5] and has just been published as an illustrated booklet.[6] It reminds the reader of the phenomenal growth in the number of passengers carried by air on scheduled services throughout the world: about 90 million in 1957, as against 2½ million in 1937. This rapid growth puts a steadily increasing strain on health and airport facilities and personnel, and must, because of continuing expansion, present problems in the future that will be difficult to solve. But the need for clean and sanitary airports requires no emphasis; neither the appeal of air travel nor the efficiency of air crews can be allowed to be impaired. As the guide puts it, " airports should be the show windows of the countries concerned ". It accordingly makes specific recommendations on water, food, and wastes.

Water

All water for drinking and other personal use by the crews and passengers, whether in the air or on the ground, should be free from chemical substances and micro-organisms that might cause illness in any form, and should also be not only safe but attractive as well, lacking turbidity, colour, and disagreeable taste or odour. Preferably it should come from well-operated public supply systems conforming to acceptable standards; but it should in any case follow the country's standards for drinking-water, and if the quality is lower than that established by the WHO International Standards for Drinking-Water[7] it should be given precautionary disinfection. Samples should be taken at least once weekly from representative points, and the results of bacteriological analysis reported to the airport health and operating authorities and used to determine whether the airport water meets the bacteriological standard and, if not, what corrective measures are required. The water supply should be inspected by a competent sanitary engineer at least once a year, and also whenever changes are made in the system that might affect the quality of the water. If the airport authorities are themselves responsible for the water supply they must provide safe water of a quality at least equal to that established by the WHO International Standards for Drinking-Water.

If water must be drawn from a supply of inferior or unknown quality for use by crews or passengers, it should be given sufficient treatment to destroy the cysts of *Entamoeba histolytica* and the virus of infectious hepatitis; all the other disease organisms generally found in contaminated water will be destroyed by this treatment. Boiling is effective except at altitudes above 3000 m (about 10 000 ft). If chlorination is used, the water to be treated must be clear and free from noticeable pollution. Filtration can be used to remove suspended solid matter, and when done through porcelain filters or about 75 cm (30 inches) of filter sand can effectively remove cysts. Chlorination to about 0.3 parts per million (p.p.m.) of residual chlorine destroys the vegetative forms of water-borne disease bacteria, but very much larger amounts, of the order of 8-10 p.p.m. of free available chlorine, are needed to kill amoebic cysts and inactivate the virus of infectious hepatitis. These large amounts may produce objectionable tastes and odours, and dechlorination is then advisable with sodium thiosulfate, sulfur dioxide, or some comparable reducing agent that is not itself toxic. All water should be chlorinated to such an extent before loading on aircraft that it contains 0.3 p.p.m. of free available chlorine 30 minutes after treatment.

It is not enough that the water supply should be safe. Care should also be taken to ensure that drinking fountains, pipes, aircraft water systems, water hose, and water carts—everything, in fact, in which the water is kept or through which it passes—are easy to clean, and are kept clean.

[5] *Wld Hlth Org. techn. Rep. Ser.*, 1959, **174**

[6] World Health Organization (1960) *Guide to hygiene and sanitation in aviation*, Geneva

[7] World Health Organization (1958) *International standards for drinking-water*, Geneva

Food

Food should be of good sanitary quality, placed in refrigerators as necessary, and kept scrupulously clean. All meat and fish should be thoroughly cooked before serving. In tropical countries infection with *Ascaris* is widespread, so that raw foods such as green salads and chopped raw vegetables should be avoided. All food should be carefully handled and protected from contamination by animals, insects, soiled hands, and dirty surfaces. To prevent chemical poisoning, vessels and utensils containing such elements as cadmium and lead should be avoided, the strictest precautions observed regarding the use of poisons around food areas, and only foods of the highest purity purchased. Because of the special hazards of foods like cream, milk and milk products, cracked eggs (especially ducks'), shellfish, gravies, and meat salads and dressings, preference should be given to plain simple foods requiring the minimum of handling. Raw oysters and other shellfish should not be used unless it is certain that they are fresh, uncontaminated, and come from clean areas. Milk and milk products should be sterilized and kept in bottles; and the opened bottles should remain in refrigerators.

Food-handlers should be placed under medical control, and no person should be employed who is a carrier, or in the communicable period, of a disease, or suffers from a gastro-intestinal infection or an acute sore throat, or has on the exposed portion of the body an open wound, infection, or skin disease. Spitting and the use of tobacco in any form should be prohibited in areas where food is prepared. All those who prepare or handle food should keep their hands and fingernails scrupulously clean, wear clean garments, handle food in such a way as to minimize the risk of contamination, and work with surfaces, receptacles, and utensils that are easy to keep clean and regularly kept clean. The buildings and premises in which they work should be so designed as to make the task of protecting the food from contamination easy. Special cleansing and germicidal treatment should be given to dishes and utensils before use; the guide gives details of methods that can be used, both in airports and on aircraft.

Wastes

The guide contains a detailed description of the handling and disposal of toilet wastes, sewage, air-sickness containers, and refuse, at airports and on aircraft. Particular care should be taken to avoid spillage or open exposure, since this leads to fly and rat infestations. If practicable, the final disposal of garbage should be at a point remote from the airport; if not, it can be burned, buried, or ground and discharged into a sewer; open pits or dumps are unsatisfactory because of flies and rats. On aircraft the provision of watertight receptables, easily cleanable floorings, soil-cans, tanks, and wash-basins is important.

Vector control at airports

Rooms used by crews and passengers in transit at international airports should be effectively mosquito-proofed in areas where mosquitos and flies are prevalent. Every day, any mosquitos that may have gained entrance should be destroyed. Walls and ceilings, particularly in sleeping quarters, should be sprayed regularly with residual insecticide, in accordance with the recommendations of the WHO Expert Committee on Insecticides.[8] Destruction of the larvae of mosquitos should be systematically carried out in the entire area within mosquito flight range of buildings used by crews and passengers, by ditching, draining, filling, and elimination of water containers, or by application of larvicides. To keep the area within the perimeter of the airport free from *Aëdes aegypti* in its larval and adult stages, active anti-mosquito measures must be maintained over an area of at least 400 m (¼ mile) around that perimeter, and all water cisterns and tanks covered or screened. For the control of flies the best method is to secure community co-operation in eliminating their breeding-places, and to combine this with scrupulous cleanliness at

[8] *Wld Hlth Org. techn. Rep. Ser.*, 1958, **153**

the airport itself and spraying or other methods of killing the insects. All organic wastes should be disposed of quickly to prevent flies from breeding in them.

The control of rats is not easy, and it is advisable that the services of experts be sought in devising and maintaining a control programme. The first step towards success is good housekeeping, general cleanliness, and orderly storage of all materials, food or otherwise, off the ground or floor and in piles or bins. Rat-proofing is essential: a section of the guide is devoted to ways and means of doing it properly. Not a simple task, this, for rats, apart from their gnawing powers, can jump 60 cm (24 inches) vertically, burrow equally far into the earth, climb smooth pipes up to 7.5 cm (3 inches) in diameter, and travel along horizontal electric wires. As both the flea and the rat are involved in the transmission of plague, equipment and facilities are necessary for disinsecting air crews and passengers, and for disinsecting, disinfecting and deratting baggage, other articles such as bedding, and portions of the aircraft. A rodent control programme that includes the rat-proofing of buildings should be an integral part of the health services of every international airport.

Ground installations

To carry out this sanitary work airports must have adequate staff, equipment and premises. The adequacy and efficiency of ground installations is of interest and concern to many groups, and to increase efficiency and co-operation committees such as national and local facilitation committees should review procedures and practices and study possible improvements. Health authorities, airport authorities, air transport officials, caterers and others interested should be represented on a review committee that will watch over the type, quality and condition of equipment, the adequacy and promptness of operations, and the proficiency, intelligence and competence of personnel.

YAWS CAMPAIGN IN NORTHERN GHANA

A yaws campaign was launched in Northern Ghana in April 1956, with WHO and UNICEF assistance. Its first stage has now been completed, and an interim report has been prepared by Dr David Scott, the specialist epidemiologist in charge of the Ghana Ministry of Health medical field units which carried out the work of the campaign. The article below is based on Dr Scott's report.

Northern Ghana covers an area of some 37 700 square miles of typical savannah country, divided into 11 administrative districts. The population in the 1948 census was 1 045 093, the density being greatest in the east and in the extreme north-west. The people are almost exclusively cultivators of the land, growing as main crops millet, maize and yams, but also rearing shorthorn cattle in some areas. There are 11 hospitals and 4 health centres.

In 1937, special services were organized in Ghana to cope with an epidemic of sleeping sickness; and when the epidemic was over the services remained, to be transformed later, together with smaller yaws services created in 1944, into general medical field units. The staff of these mobile units have a long tradition of medical work in the field; they are accustomed to the hardships this kind of work brings in its train; they are experienced in establishing and maintaining good public relations; and they have been trained in the recognition, registration, and treatment of a number of endemic and epidemic diseases.

Before 1944 no mass attack had been made on yaws in Ghana. Individual cases attending hospitals and other centres had received treatment with bismuth and arsenic preparations, but the effect on the prevalence of yaws

must have been little or none. In 1944 a yaws control unit was set up: mobile teams moved systematically from village to village in a selected area in the eastern part of Northern Ghana, and persons found infected were treated. From 1947 to 1953 joint surveys were made for both yaws and sleeping sickness, and mass campaigns were carried out against yaws with bismuth and arsenic as the principal weapons. Still the effect on the prevalence of the disease was slight, the reason being that the disease is often present in a latent phase and cannot be detected by a survey unit. When the treatment teams have gone, the latent cases may become overt and provide a source of infection in the community. Bismuth and arsenic treatment is prolonged and carries some degree of risk, and can only be given to overt cases.

In the years 1947 to 1953 the control of yaws was therefore not separate from the control of other diseases. The diagnosis and treatment of individual cases was the work of the joint survey teams, and the areas selected for attention were not necessarily those most heavily infected but rather those where sleeping sickness was also present. In 1953 penicillin began to be used instead of bismuth and arsenic. Penicillin permitted a new approach to the problem of yaws control: it is extremely safe to use, and in most cases one injection is sufficient to cure; it can therefore be used to cure both overt and latent cases, and it enables a campaign to be carried out with unprecedented speed, an important consideration in the eradication of the reservoir of infection in a community. To exploit this new and effective weapon fully, however, special yaws control teams are needed, and some were in fact created out of the joint teams in the latter part of 1953; but not in sufficient numbers to attack the disease on the wide front required in Northern Ghana.

In 1954, after visits by WHO and UNICEF representatives, the Government asked these organizations to help it with yaws control, and a plan was drawn up for a limited campaign in Northern Ghana—limited because the medical staffing situation was at the time precarious. The plan was put into operation in 1955. In 1956, however, the staffing situation was so much improved that the Government asked WHO and UNICEF to make the plan more comprehensive.

The present agreement between the Ghana Government and WHO and UNICEF was signed in 1957 and replaced one made two years earlier. The area chosen for the campaign covered 7 out of the 11 administrative districts of Northern Ghana, containing only half of the population; the other districts were excluded because the incidence of yaws there was thought to be low. The aim was not only to treat active and latent cases and contacts in accordance with the policies recommended by WHO and set out in the fourth report of the WHO Expert Committee on Venereal Infections and Treponematoses,[1] but to train staff and expand the organization so as to eradicate the disease throughout the whole country. The Ghana Government was to operate the plan, WHO giving advice and guidance, UNICEF equipment and supplies.

Northern Ghana has neighbours on every side with a similar climate and populations also suffering from yaws. A campaign against yaws would consequently risk failure if steps were not taken to attack the disease across the border, particularly in areas where people from Ghana visit villages and fairs. International co-operation was therefore invoked, and it was arranged that when the campaign started a similar campaign should also begin in the Ivory Coast and in Togoland.

The seven districts were covered according to a pre-arranged plan and in a systematic way. The teams moved from village to village, warning the villagers in advance of their coming. Teams worked in pairs, each team consisting of an examiner and an injector. Each pair of teams was in the charge of a field assistant, who dealt with publicity, returns, stores, etc. A single team might deal with 1000 persons in a day, but if the villages were small and scattered the number would be very much less. A day or two behind the teams came a checker, whose function it was to treat those who had, for whatever reason, missed being treated. The entire population was examined. All patients with clinically active disease were treated and the remainder

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1953, 63

of the population received half doses as latent cases and contacts.

The whole population of each survey area was re-examined on three separate occasions at six-monthly intervals after the initial survey. If the incidence of infectious yaws was more than 2%, total mass treatment was given to the whole village. If it was between 0.5% and 2%, juvenile mass treatment was given, i.e., adults who appeared to be free from infection were left untreated but all persons under the age of 15 years were treated. Finally, if it was under 0.5%, selective mass treatment was given, i.e., cases received a curative dose and only their household contacts were given protective treatment.

Supervision was exercised by the medical officers in charge of the two medical units of Northern Ghana. A certain amount of day-to-day supervision had of necessity to be delegated to the senior subordinates.

To the east of the survey area public co-operation initially was not entirely satisfactory, for unknown reasons. To the west, by contrast, it fell away as the campaign progressed, for more obvious reasons: not everyone in a community will find it convenient to attend for examination at six-monthly intervals, especially when, towards the end of the programme, residual infection is low. In these circumstances house-to-house inspection had to take the place of examination at a central meeting-place. In some areas of Northern Ghana (as in many other communities in Africa) there are continuous movements of population, many people going south to provide seasonal labour at the end of the harvest. This has obviously a great deal of bearing on many aspects of yaws control, and can never adequately be taken into account in interpreting the records of surveys and resurveys.

Altogether the medical field unit teams, in the initial survey and subsequent three re-surveys, did 2 056 094 examinations. At the time of the initial survey the number of cases of yaws was 50 148 (9.44%); at the time of the last resurvey 6381 (1.22%), a reduction of about 87.5%. To begin with, the incidence of infectious yaws was 1.5%; at the end 0.19%. A few areas continued to show a high incidence of infectious yaws at the end of the first stage of the campaign; and these will receive special attention. But only two of the 48 survey areas showed a final incidence of 0.5% or more of infectious yaws, the figure WHO considers to present the line below which mass surveys could be discontinued, surveillance then being maintained by integrating antiyaws activities into the public health service if adequate facilities are available in the community. On the other hand, the comparable figure of 2% incidence of total yaws was exceeded by two areas in the north-east and by 21 out of 22 in the north-west. Probably about 92% of the population was covered.

Control has now reached the second stage. Resurveys will be carried out according to the amount of yaws found in each survey area at the last resurvey. The central aim is to continue to attack the infection household by household either until it is reduced to a negligible amount or until improved living standards make transmission difficult. After another decade perhaps it may be practicable to make infectious yaws a notifiable disease in the same way as smallpox and trypanosomiasis are today. Only five years ago, Dr Scott remarks, this possibility would have been considered no more than a wild dream.

AËDES AEGYPTI ERADICATION IN BRAZIL

During the present century yellow fever has been greatly reduced as a public health problem; the development of effective methods of control has been made possible by the elucidation of the etiology and epidemiology of the disease. The campaigns against yellow fever in the Region of the Americas are especially interesting, not only because of the nature of the problem in that Region but also because of the kinds of international collaboration instituted to deal with it.

The most effective way to control urban yellow fever is to eradicate *Aëdes aegypti*, the mosquito vector of the disease. Against jungle yellow fever the only effective weapon as yet is vaccination.

Size and climate made Brazil the American country most infested by *A. aegypti*, and the fight against this vector has been going on there since the beginning of the century. Up to 1931 the campaign was carried on in a rather desultory fashion, but with the coming into force of the Regulations of the Yellow Fever Service a basis was established for the organization of the control measures that were to culminate 24 years later in the eradication of the mosquito. These regulations made it possible to apply oil to all domestic water containers used by the mosquitos as breeding places and to fine property owners for failing to comply with the orders of the Yellow Fever Service.

In Brazil from 1933 to 1937 the first great eradication campaign that had been waged against the insect vector of any disease until then was waged against *A. aegypti*. Improved methods were adopted and applied by a country-wide service with great efficiency. Until 1940 the direction of the campaign was entrusted to the Rockefeller Foundation; in that year the Brazilian Government assumed full charge, and the eradication of the mosquito from its last refuges was attained by purely national efforts.

In 1940 the great importance of the resistance of the eggs of *A. aegypti* to desiccation for months on end was recognized. Near Rio de Janeiro it was observed that the mosquito was breeding in rot holes in orange trees; thousands of these holes had to be found and filled with cement. A much more important problem was the reinfestation by *A. aegypti* of localities on the banks of the big rivers, particularly the Parana river system, by boats coming from countries without control services against the mosquito. This showed the need for the campaign to be carried out internationally.

By 1947 *A. aegypti* infestation had been confined to the rural portions of the north-eastern part of Brazil. This raised the hope that eradication of the mosquito from the whole country would soon be achieved.

The availability of DDT with its lengthy residual action greatly hastened the fulfilment of this hope. In March 1955 the country's last *A. aegypti* were found, in a very isolated place in the State of Bahia. Brazil has now the great satisfaction of having completely protected a huge section of its population against all risk of yellow fever, and of having by its experience contributed to the successful outcome of similar campaigns in all the other countries of the Americas, and elsewhere.

Brazil is a huge country, with a total area of 8 469 885 km², a very large part of which was originally infested with *Aëdes aegypti*. An area of 8 270 297 km² was surveyed for the mosquito, which was found in 244 366 of the 4 720 439 habitations originally inspected. Of the 1894 *municipios* (counties) into which Brazil is divided, 1882 were surveyed and *A. aegypti* was found in 1187. In 961 of these eradication was achieved with oil, leaving only 226 to be cleaned up with DDT. Of the 268 576 different localities surveyed, 36 119 were found to harbour the mosquito. From 1931 to 1957, a total of 617 021 537 house visits were made, and 3 414 210 354 water containers were inspected.

Early in 1958, in its capacity as co-ordinator of the campaign for the eradication of

A. aegypti from the Americas, the Pan American Sanitary Bureau, which acts as the WHO Regional Office for the Americas, accepted the invitation of the Brazilian Government to send two consultants to Brazil to make a spot check for the presence of the mosquito. It was obviously not possible to survey all the areas previously infested, and, in view of the time that had elapsed since the last focus had been found and the number of routine checks made in the areas of low infestation, the survey was limited to the eastern and north-eastern states of Brazil, where the rural infestation had been greatest and the eradication operations most difficult.

The PASB consultants supervised the work of 24 experienced Brazilian inspectors. In 20 weeks the team inspected 72 478 dwellings in 1165 localities in 102 municipalities. Not a single *A. aegypti* was found.

The XVth Pan American Sanitary Conference, held in Puerto Rico from 22 September to 4 October 1958, examined the reports submitted by Brazil and ten other countries regarding the eradication of *A. aegypti*, and concluded that the mosquito had been eradicated from all of them. The Conference appealed to all the other countries of the Americas that still harbour *A. aegypti* to intensify their eradication programmes.

Epidemiological and Statistical Information

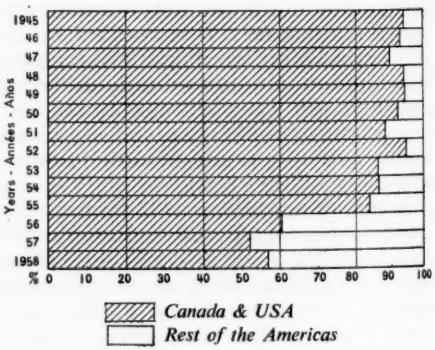
POLIOMYELITIS IN THE AMERICAS

Data on the incidence of poliomyelitis in the Americas over the past few years have recently been published by the Pan American Sanitary Bureau, which acts as the WHO Regional Office for the Americas.[1]

Introducing these data, the PASB warns that " for a given disease the cases reported to the health authorities generally represent only a fraction of the actual cases, " and adds: " a strict comparison should be avoided between countries whose social and health conditions are dissimilar." During the four years 1955-1958 the reported incidence rates of poliomyelitis per 100 000 population varied from nil for the Dominican Republic in 1957 to as much as 33.3 for Argentina in 1956. Data for all the countries concerned are shown in Table 1.

It is interesting to note that the total number of poliomyelitis cases reported annually in the Americas from 1955 to 1958 has decreased by more than two-thirds, from 35 761 to 11 123.

PERCENTAGES OF REPORTED CASES OF POLIOMYELITIS IN CANADA AND THE UNITED STATES AND THE REST OF THE AMERICAS, 1945-1958



The available data show that, during the years 1945-1958, poliomyelitis was a problem of considerable magnitude in Canada and the United States, with more than 80% of the cases reported in the Americas up to 1955 ascribed to the two countries (see figure and Table 2). It is not possible to say to what

[1] Pan American Sanitary Bureau (1959) *Health statistics*, **8**, No. 2, 3

TABLE 1. CASES OF POLIOMYELITIS PER 100 000 POPULATION IN THE AMERICAS 1955-58

Country or Territory	1955	1956	1957	1958
Argentina *	2.3	33.3	3.8	4.0
Bolivia	0.0	0.6	0.4	0.1
Brazil **	4.1	7.4	4.8	...
Canada †	6.5	3.8	1.6	1.8
Chile	6.4	10.9	5.0	...
Colombia ††	1.4	0.9	1.4	1.7
Costa Rica	4.7	17.2	4.9	5.4
Cuba	4.4	0.9	1.5	1.6
Dominican Republic	—	0.6	0.0	...
Ecuador	1.1	0.8	1.1	0.9
El Salvador *, ††	0.4	2.4	2.9	...
Guatemala *	2.6	4.4	3.1	...
Haiti	—	—	1.3	...
Honduras	...	...	...	1.2
Mexico *	6.1	2.0	5.0	2.8
Nicaragua *	9.1	3.7	5.1	18.4
Panama	1.6	16.3	0.5	0.5
Paraguay	5.2	7.2	2.1	...
Peru ††	4.9	6.9	6.5	9.8
United States of America	17.6	9.1	3.2	3.5
Uruguay	21.1	2.7	1.8	...
Venezuela ††	11.7	9.3	7.6	5.7
Alaska	27.3	5.3	1.9	...
Bahama Islands	—	—	1.7	...
Barbados	—	—	0.4	—
Bermuda	—	—	2.4	—
British Guiana *	0.4	0.8	18.2	—
British Honduras	1.3	—	—	...
Canal Zone	10.3	42.9	—	...
French Guiana	—	30.7	—	—
Guadeloupe	5.5	1.6	—	...
Hawaii	36.8	11.8	1.8	...
Jamaica	4.6	0.9	25.0	...
Leeward Islands				
Antigua	—	...	...	...
Montserrat	...	...	...	...
St Kitts, Nevis, Anguilla	—	1.8	—	—
Virgin Islands	—	—	...	—
Martinique	0.8	—	—	—
Netherlands Antilles	7.7	13.0	—	...
Puerto Rico	19.2	2.4	1.9	...
Surinam	—	...	—	—
Trinidad and Tobago	2.2	1.2	35.0	...
Virgin Islands (USA)	4.2	—	—	—
Windward Islands				
Dominica	—	...	...	...
Grenada	—	...	33.0	—
St Lucia	1.1	9.0	4.4	—
St Vincent	—	...	...	...

* Paralytic poliomyelitis
** Federal District and State capitals (excluding Niteroi, 1955)
† Excluding the Yukon and Northwest Territories
†† Data from reporting areas

— = No cases ... = Data not available

TABLE 2. CASES OF POLIOMYELITIS REPORTED IN THE AMERICAS, CANADA AND UNITED STATES AND IN THE REST OF THE AMERICAS, AND RATES PER 100 000 POPULATION AND PERCENTAGE, 1945-1958

Year	All Countries			Canada & United States			Rest of the Americas		
	Cases	Rate *	%	Cases	Rate *	%	Cases	Rate *	%
1945	14 947	6.2	100.0	14 008	9.2	93.7	939	1.0	6.3
1946	30 467	12.3	100.0	28 225	15.2	92.6	2 242	2.4	7.4
1947	14 659	5.8	100.0	13 118	8.4	89.5	1 541	1.6	10.5
1948	30 840	12.0	100.0	28 894	18.1	93.7	1 946	2.0	6.3
1949	47 337	18.0	100.0	44 491	27.4	94.0	2 846	2.8	6.0
1950	37 224	13.7	100.0	34 211	20.7	91.9	3 013	2.8	8.1
1951	35 095	12.6	100.0	30 954	18.5	88.2	4 141	3.8	11.8
1952	66 374	23.6	100.0	62 634	36.8	94.4	3 740	3.4	5.6
1953	51 566	17.8	100.0	44 470	25.7	86.2	7 096	6.1	13.8
1954	47 320	16.0	100.0	40 866	23.2	86.4	6 454	5.4	13.6
1955	35 761	11.8	100.0	30 006	16.7	83.9	5 755	4.7	16.1
1956	26 068	8.5	100.0	15 747	8.6	60.4	10 321	8.3	39.6
1957	11 043	3.5	100.0	5 758	3.1	52.1	5 285	4.0	47.9
1958**	11 123	3.4	100.0	6 330	3.3	56.9	4 793	3.6	43.1

* Per 100 000 population ** Provisional

extent the recorded numbers of cases represent reality or merely reflect greater or lesser efficiency in reporting in different countries. Nevertheless, the figure shows that, according to official notifications, poliomyelitis is becoming, with every year, a more important public health problem in Central and South America. Whether this reflects the result of control measures and other epidemiological factors in Canada and the United States, or a better knowledge and understanding of poliomyelitis south of the Mexico-United States border, the disease seems destined to play an ever-growing part in the public health programmes of the Central and South American countries and territories.

Another interesting conclusion suggested by the data collected by PASB is that the pattern of the disease, from the standpoint of the age groups affected, varies among different countries. While in Mexico, 92.5% of reported cases occur in children under 5 years of age, justifying the name of "infantile paralysis" given to the disease until recently, in Canada only 26.5% of the cases occur in that age group.

On the whole, however, the data available for North and South America appear to confirm the tendency, found elsewhere in the world, for poliomyelitis to become a problem of importance in an increasing number of countries, and to affect not only children, but also adolescents and adults.

MORTALITY FROM CARDIOVASCULAR DISEASES

A recent WHO *Epidemiological and Vital Statistics Report*[1] was devoted mainly to mortality from cardiovascular diseases, and contains statistical data from selected countries for the years 1954-1956.

In accordance with international usage, the term "cardiovascular diseases" includes a number of diseases of the heart and blood vessels that are listed in the International Statistical Classification of Diseases, Injuries, and Causes of Death. They are grouped as follows:

(1) cardiovascular syphilis;

(2) vascular lesions affecting the central nervous system;

(3) rheumatic fever;

(4) chronic rheumatic heart disease;

(5) arteriosclerotic and degenerative heart disease;

(6) other diseases of the heart;

(7) hypertensive heart disease;

(8) hypertension without mention of the heart;

(9) diseases of arteries;

(10) diseases of veins and other diseases of the circulatory system;

(11) congenital malformation of the circulatory system;

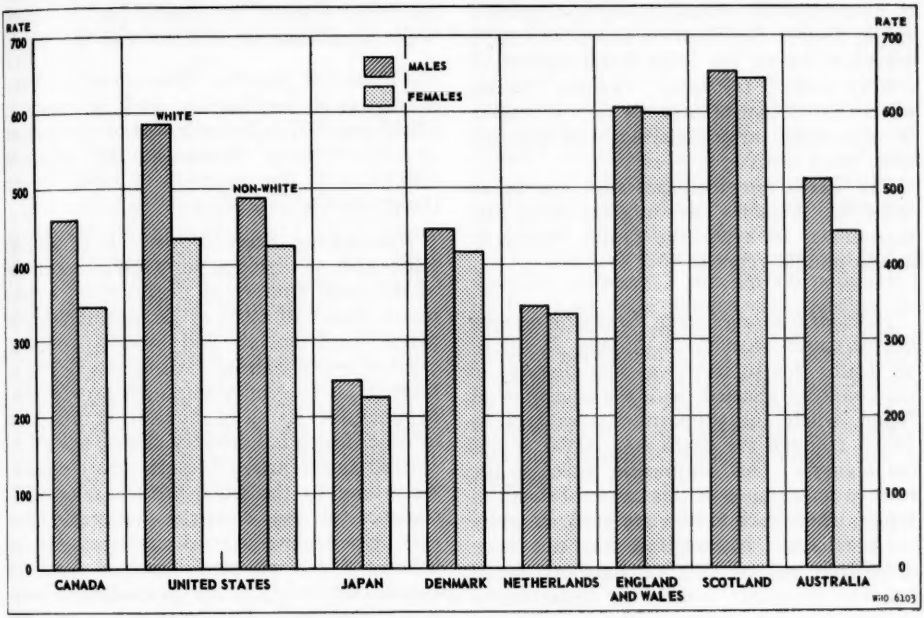
(12) symptoms referable to the cardiovascular and lymphatic systems.

In the selected areas, with the exception of Japan, cardiovascular diseases cause between 55.4% (white population of the USA) and 44.6% (Netherlands) of all deaths. In Japan this proportion is as low as 29.5%.

The highest crude death rates are those of Scotland and England and Wales (648.7 and 601.7 respectively) and the lowest—with the exception of Japan (235.7)—is that of the Netherlands (338.9). These crude death rates are, of course, not comparable, owing partly to differences in the population structure; age and sex specific death rates, however, show that the lowest rates are those of the Netherlands and Denmark, the highest those of Scotland and England and Wales. The Japanese age specific death rates are higher in every age group below 75 years than those of Denmark and the Netherlands, and, in fact, have the same pattern as in other areas. Mortality from cardiovascular diseases per 100 000 population is shown in the figure.

[1] *Epidem. vital Statist. Rep.*, 1959, 12, No. 10

MORTALITY FROM CARDIOVASCULAR DISEASES, PER 100 000 POPULATION



The table that follows shows the median death rate for each component of cardiovascular deaths in the selected countries during the period 1954-1956.

Cause of death	*Median death rate*
Arteriosclerotic and degenerative heart disease	226.6
Vascular lesions affecting the central nervous system	119.9
Diseases of arteries	24.5
Hypertensive heart disease	24.1
Other diseases of the heart	19.3
Chronic rheumatic heart disease	8.9
Other hypertensive disease	8.4
Congenital malformation of the circulatory system	5.6
Diseases of veins and other diseases of the circulatory system	2.8
Cardiovascular syphilis	1.2
Rheumatic fever	0.8
Symptoms referable to the cardiovascular and lymphatic systems	—

Arteriosclerotic and degenerative heart disease accounts for the highest median mortality rate, causing on an average more than half the deaths due to all cardiovascular diseases. Vascular lesions affecting the central nervous system come next in importance. These two groups cause on an average more than 78% of all deaths attributed to cardiovascular diseases.

Arteriosclerotic and degenerative heart disease is responsible for the greatest number of deaths from cardiovascular diseases in all the countries selected, with the exception of Japan. It accounts for 38.5% of all cardiovascular deaths in the non-white population of the USA and 58.8% in the white population of the same country. In Japan it accounts for 18.6%. The death rate in Japan is as low as 43.9 per 100 000 population, while in the other countries it ranges between 348.8 (Scotland) and 160.1 (Netherlands). The

great discrepancy between Japan and the other countries may be real, or simply due to differences in medical concepts, diagnostic skills, disease classification and certification practices, or to the local interpretation of coding rules. In Japan vascular lesions affecting the central nervous system replace in importance arteriosclerotic and degenerative heart disease.

The death rate increases with age in all countries. Females have a lower death rate than males in every age group, especially in the middle years of life.

Vascular lesions affecting the central nervous system cause between 20.4% and 28.9% of all deaths due to cardiovascular diseases in the countries selected, with the exception of Japan, where the proportion is as high as 59.0% (though the death rate, 139.0, is not the highest). This proportion indicates the relative importance of this cause of death in Japan, where such lesions are predominantly haemorrhagic. Although it has not been definitively proved, cerebral haemorrhage is believed to occur usually in hypertensive persons at sites where arterial walls are weakened by disease. Whether or not cerebral haemorrhage in Japan is usually the result of cerebral arteriosclerosis is not known, but death rates for arteriosclerotic and degenerative heart disease, hypertensive heart disease, diseases of arteries and other diseases of the circulatory system are much lower in Japan than in the other countries selected. On the other hand, death rates for symptoms referable to the cardiovascular and lymphatic systems are many times higher in Japan than in the other countries. It would appear to be worth while to compare methods of certification, diagnostic criteria and coding practices in Japan with those of other countries as a preliminary to any inquiry into the meaning of the differences between Japanese statistics and those of the other countries.

Death rates for vascular lesions affecting the central nervous system range, in the countries selected, between 90.6 (Canada) and 187.3 (Scotland) per 100 000 population. The median rate progresses with age from 1.8 per 100 000 population in the age period below 35 years to 2072 in the age group 75 years of age and over. Age specific death rates are highest in general for the non-white population of the USA and for Japan.

Diseases of arteries. This cause of death is responsible for between 3.6% (non-white, USA) and 6.6% (Netherlands) of deaths due to cardiovascular diseases in the countries selected, with the exception of Japan, where the proportion is 1.6%.

Hypertensive heart disease. It is almost impossible to arrive at an accurate estimate of the total number of deaths from hypertensive heart disease, or to distinguish between hypertensive and non-hypertensive cases of arteriosclerotic heart disease. This is because the present coding rules provide that hypertensives dying of myocardial infarction or other forms of coronary disease should be entered under arteriosclerotic heart disease. According to the published cause-of-death statistics in the countries selected, however, hypertensive heart disease accounts for between 1% of all cardiovascular deaths in Japan and 18.2% in the non-white population of the USA. The death rate ranges between 2.3 (Japan) and 82.7 (non-white population of the USA) per 100 000 population.

Rheumatic fever. This cause is responsible for between 0.1% and 0.4% of deaths due to all cardiovascular diseases. Death rates of the populations under discussion range between 1.4 (non-white population of the USA) and 0.3 (Netherlands), with a median rate of 0.8, per 100 000 population.

The median death rate below 45 years of age was 0.6 per 100 000 population, and increased with age until it reached 1.2 in the age group 75 years and over. It is interesting to note that the death rate is exceptionally high in Japan in the older age groups, being 4.9 in the age group 65-74 years and 7.1 in the age group 75 years and over.

Chronic rheumatic heart disease. In the countries selected this cause of death accounts for 1.5-3.1% of deaths due to all cardiovascular diseases. The death rates range between 3.6 (Japan) and 18.9 (England and Wales) per 100 000 population.

The age specific death rate progresses with age. The median rate is 1.3 per 100 000 population below 35 years of age, and increases to 45.4 in the age group 75 years and over.

In all the countries selected, the death rate is higher for females than for males, with the exception of the USA, where it is practically the same for both sexes.

Congenital malformations of the circulatory system are the cause of 0.7 to 1.7% of deaths due to cardiovascular diseases. The death rate ranges between 2.6 (Japan) and 6.5 (Canada) per 100 000 population.

The highest proportions and rates are found in the youngest age group, in which congenital malformations of the circulatory system are by far the most important cardiovascular disease causing death. The death rate is higher for males than for females in all the selected countries.

Cardiovascular syphilis. A generation ago syphilis ranked as a major cause of heart disease. Today syphilitic heart disease is rare, because early treatment with penicillin eliminates the original infection long before the heart and blood vessels become involved. This may explain the present low death rate for cardiovascular syphilis, which in the selected countries ranges between 0.7 and 2.5 per 100 000 population, except in the non-white population of the USA, where the rate is 5.6 per 100 000 population.

The death rate for cardiovascular syphilis does not exceed 0.2 per 100 000 population in the lower age groups, but reaches its maximum in the groups 65-74 years or above, ranging between 4.2 and 12.3 per 100 000 population (except in the non-white population of the USA, where it reaches the high level of 33.3). The death rate for cardiovascular syphilis is higher in males than in females.

Educating the people for malaria eradication

" The task [of malaria eradication] involves planning and preparation on a tremendous scale. It needs tens of thousands of teams of field workers and millions of tons of supplies and equipment. Hundreds of millions of homes must be visited, hundreds of millions of blood tests carried out and tons of drugs supplied. Remote habitations must be visited, requiring all manner of mechanized or animal transport, and several categories of specialists—including doctors, engineers and laboratory workers—and lay helpers must be mobilized to work in co-ordination...

" Much valuable time can be saved if the people have their houses ready for spraying when the spraying team arrives. It is also important that every single house be treated with the insecticide. An untreated house may well become a pocket of infection and a threat to the entire community. Therefore any person who, through indifference or ignorance, neglects to have his house sprayed should be prevailed upon by his enlightened neighbours to fall in line with the rest of the community.

" In the second phase of the programme, when the spraying is over, attention is concentrated on the discovery and treatment of malaria patients. The people can render valuable assistance by promptly reporting all cases of fever to the health authorities and by observing the rules to prevent the infection from spreading...

" Eradication will mean the liberation of millions from this enslaving disease which saps the energy of the people, kills initiative and is economically ruinous. For instance, it is estimated that in one country of this Region—India—the annual economic loss caused by this disease is $500 000 000. On the positive side is the example of Ceylon where the virtual disappearance of malaria has resulted in a saving of about $30 000 000 a year—which is six times the total expenditure on the 10-year antimalaria campaign.

" [It is important] to start a process of education of the public leading to their active co-operation in the effort which the governments of this Region are making to wipe out malaria."

Dr C. MANI, WHO Regional Director for South-East Asia

Reports of Expert Groups

Teacher preparation for health education *

Health education is not always recognized as a discipline of its own and given an appropriate place in the training of teachers. Training courses as they now exist are insufficiently practical, insufficiently comprehensive, based on an incomplete understanding of health problems or of what health services and resources are available, and too often dependent on the assumption that health education can be taught through such courses as physical education and biology. Too little time is given to the subject, instruction often consists only of lectures to large classes, and practical training in the form of practice teaching, if provided at all, is often inadequately planned or executed. There is a serious shortage of teaching staff with health education training, and of textbooks and educational material.

Growing interest in health education and recognition of its importance give promise of a changed outlook for the future, and the need for some form of international guidance in the training of teachers was acknowledged by a Joint WHO/UNESCO Expert Committee that met in Geneva in November 1959 [1] to prepare a " flexible framework of guiding principles on teacher preparation for health education ". The training of a teacher in health education—the Committee urged—should take place not only through courses of instruction but also through the life he leads in his training institution and in the school community, his contact with student services, and his experiences in practising teaching.

Health education in schools should be based on the health needs and interests of the child. The teacher has many opportunities for imparting this education, because he is concerned with planning for healthy living in the school, has a role in the school health services, and is the person who will give direct health teaching to the children. He can, too, seek the help of physicians, dentists and others in giving instruction on health. If trained in the practical aspects of nutrition he can encourage pupils to develop good food habits and understand the relation of food to growth and health, and see that classes of domestic economy are used for this purpose as well as to inculcate sensible habits in child care and feeding, home improvement and sanitation, and family relationships.

To give health education successfully the teacher must have had specific and systematic instruction on growth and development, personal and community health, school health practice, and methods of health education. Knowledge of these subjects he may acquire by health activities in his training institution, by his relations with student health services, and from direct instruction, as well as by practising health teaching as he practises teaching in other subjects. When he becomes a fully fledged teacher himself he will have further opportunities of gaining experience of health education, not only by the process of teaching itself, but also by planning curricula and from extension or correspondence courses, short courses or seminars, or working conferences of teachers.

* Joint WHO/UNESCO Expert Committee on Teacher Preparation for Health Education (1960) *Report* (*Wld Hlth Org. techn. Rep. Ser.*, No. 193), Geneva, 19 pages. Price: 1/9, $0.30, Sw. fr. 1.—. Also published in French and Spanish.

[1] Members of the Committee: Dr F. W. Clements, Australia (Chairman); Mrs Silvia de Duncan, Panama; M. L. François, France (Vice-Chairman); Dr W. A. Karunaratne, Ceylon; Professor T. Richner, Switzerland (Vice-Chairman); Miss E. Schneider, USA (Rapporteur); Dr L. Vancurova, Czechoslovakia; Miss W. M. Warden, United Kingdom (Rapporteur). Representative of the Food and Agriculture Organization: Miss M. Ross. Secretariat: Mr V. Lema, UNESCO; Mr P. T. Orata, UNESCO (Joint Secretary); Mr S. Tanguiane, UNESCO; Miss A. H. Martikainen, WHO (Joint Secretary); Dr F. Mortara, WHO; Dr J. S. Peterson, WHO; Professor C. E. Turner (Consultant); Dr W. Winnicka, WHO.

The Committee discussed the planning of training for teachers in health education, the desirability of one person in each training institution being responsible for the co-ordination of courses and activities in health education, and future national and international developments, studies and research in the subject. It felt that improvement would be achieved by the formation of joint committees representing governmental agencies in education and public health and also the teaching profession, voluntary health agencies, parental organizations and other interested bodies; the stimulation of discussion of health problems by parent-teacher and other organizations; studies of existing training activities; local pilot projects in schools to stimulate interest and promote action in health education; pilot projects in teacher training institutions; revision and improvement of the teacher's health education curriculum; seminars and extension of opportunities for training while in service; the development of suitable teaching material; and studies of ways of adapting health education to children's needs and interests, of influencing attitudes as well as habits, of developing continuity of health teaching, and of assessing the effectiveness of the various educational materials and media. International governmental and non-governmental agencies could assist with experimental programmes of health education in training institutions, providing consultants if required; finance fellowships or scholarships for study abroad; hold seminars or other meetings between countries; prepare annotated bibliographies on school health education; prepare and maintain an inventory and abstracts of all studies and research into the training of teachers in health education; and sponsor further meetings of expert groups to study the problems that may arise.

Local health service*

An indispensable preliminary to a programme for the development of local health service is some knowledge of local health and the factors influencing it. A WHO Study Group on Local Health Service which met in 1954 produced a scheme[1] for the study of local health, in the form of a questionnaire covering not only health but also general social and economic conditions. To assess the value of the scheme in areas with a long-standing health service and in others without such a service, and to experiment with methods of local health study in different areas, six pilot studies were carried out under the direction of the governments concerned, in India, the Netherlands, Puerto Rico, Sweden, the Union of South Africa, and the United Kingdom.

With these pilot studies before it a WHO Expert Committee on Public Health Administration met in October 1959 to discuss local health service.[2] A critical study of local health conditions must, in its view, examine a great variety of social, cultural, and economic factors in order to place the health situation in its correct perspective. The questionnaire prepared for the pilot studies had been based on this principle, and as a result the studies gave a representative picture of each of the communities and information that should prove of great value in assessing present needs and indicating the directions in which further advances should take place, as well as where administrative action should

* WHO Expert Committee on Public Health Administration (1960) *Third report: Local health service* (*Wld Hlth Org. techn. Rep. Ser.*, No. 194), Geneva, 49 pages. Price: 3/6, $0.60, or Sw. fr. 2.—. Also published in French and Spanish.

[1] Unpublished working document WHO/PA/247.59 (an extract is published as an annex to the report under review)

[2] Members of the Committee: Dr G. Arbona, Puerto Rico (Chairman); Sir Andrew Davidson, United Kingdom; Dr J. J. du Pré le Roux, Union of South Africa (Rapporteur); Dr G. Molina, Chile; Dr S. Seshagiri Rau, India (Vice-Chairman); Dr Z. Stich, Czechoslovakia; Dr M. Tottie, Sweden. Secretariat: Dr C. A. A. Bramlage, Netherlands (Consultant); Dr C. K. Chu, WHO (Secretary); Dr R. C. Holderness (Consultant); Dr J. M. Mackintosh, WHO; Dr J. S. Peterson, WHO; Dr F. A. Soliman, WHO; Dr S. Swaroop, WHO.

be taken to secure more precise information. In five out of the six pilot study areas a family health survey had been carried out by the sampling method and had enabled the health administrators to take a close look at families and examine in detail their health in relation to their living situation. The scope and possibilities of such a family survey—the Expert Committee held—would naturally vary from country to country and locality to locality; and would also be dependent on information taken from records in hospitals, health centres and elsewhere. Its aim should be to complement the findings of the community study so as to provide as complete a picture as possible of local conditions.

The pilot studies had been an experiment to see if the method of study outlined by the Study Group was applicable to different kinds of locality and if it needed modification. Had it succeeded? The Committee emphasized that the studies were not intended to provide a comparison between one country and another or even between different parts of the same country. But they demonstrate a means of carrying out carefully planned observations on the health and related conditions of the community, establishing a baseline on which periodical health assessment can be made, and furnishing the information whereby further needs can be determined and health programmes planned.

The pilot studies are also very useful in showing where there are gaps to be filled and improvements to be made in the original scheme of study. In the family health survey, for example, the interviewer visited the families once every two or three months, in some cases over a full year, recording his observations according to two sets of questionnaire schedules—the household and the individual. Experience showed that these intervals were too long. To enable members of families to recall their illnesses more accurately it is essential for visits to be made at intervals of not more than one month. Again, the amount of detail varies in different reports and for different subjects, and at times is totally lacking or very sketchy. The dietary survey was found difficult to carry out; in the Netherlands it was done by a dietician. In the same country the housing part of the study was done by a special interviewer assigned to it by the housing authorities. Accurate information on the cost of medical care and health services was difficult to secure because separate figures for each area were not available. Data on family income were not readily forthcoming, not only because questions about it were regarded with suspicion but also because in rural communities part of the family income is in kind rather than in cash. Finally, there is the information about illness itself. It might be expected that it would be easy to find out if, and for how long, a person has been ill. In actual fact, chronic illness like diabetes or rheumatism tends to be overlooked, unless it is accompanied by florid symptoms or is incapacitating; rural people do not always consider minor ailments worth mentioning; and not only has the length of time between interviews a bearing on the information vouchsafed about ailments suffered since the last interview, but so too have their severity and the question whether the doctor was called and whether they meant absence from work or rest in bed. Careful designing of the questionnaire and training of the interviewer would help avoid this difficulty, and even if only a rough idea of illness is obtained some useful information might be gained in countries where data are lacking.

While the pilot studies give the essential background, the picture is nevertheless not complete. For a full local health study wherever the domiciliary health staff is adequate, a survey based on the household interview method is recommended. Data precise enough to serve practical public health needs could be provided by sampling survey procedures, the sample being selected with due regard to statistical considerations and to size, and covering a not unreasonably long retrospective period. The type of survey might be longitudinal or cross-sectional (if the latter, it would have to be repeated at intervals); but other sampling patterns are possible and might be useful. The Committee described how such a survey could be carried out, and suggested the preparation of an instruction manual on

the methodology of household health surveys that would incorporate the experience gained in the pilot studies and the recommendations of the WHO Expert Committee on Health Statistics and other WHO and United Nations expert bodies. Such a manual should contain suitable questionnaires, advice on sampling procedures, definitions of the terms used, a classification and codification scheme for the data collected, and tabulation procedures.

Factors affecting local health service

The efficiency of health work in local areas is often affected adversely by over-centralization of health services, and decentralization is the remedy. But for decentralization to be a success there should be an efficient local administration ready to accept the responsibility of providing health services, and a local community that will participate actively in the work. Every possible means of promoting community participation should be explored: among them community health councils or advisory committees, Red Cross societies, and teachers; and the health staff should be given some understanding of methods of community work. General practitioners tend usually to concentrate upon the cure of the sick rather than upon the prevention of disease. If they could be given a proper idea of public health and share responsibility with the local health authorities for the protection and promotion of the health of the community, the efficiency of the local health service would undoubtedly be much increased. More attention should therefore be paid to public health in the curricula of medical schools, and there should be close collaboration between public health administrators and medical education authorities in developing field teaching facilities in community health service.

Urbanization problems are constantly being created nowadays by the rapid immigration of large populations into the towns in response to the needs of industrial development. Many of these problems could be solved by careful planning and co-ordination of all new developments, and it is essential that the health authorities be represented at a very early stage of the planning. Not only is the physical health of the people involved in these urban aggregations; their mental and social health is also involved. One means of solving some of the problems is to establish industries for women as well as for men in the area.

A balanced social and economic development in a community is an essential factor in promoting local health. The reverse is equally true: indeed, in many instances the health service has been the pioneer activity in an under-developed area and has opened the way for economic development, although its further progress has depended on social and economic advance. The Committee endorsed the view of the WHO Executive Board that the human factor is fundamental to social and economic development, and that the protection and promotion of health must underlie any programme to raise the standard of living.

Requirements for further development

A well-organized domiciliary service should supplement the work of hospitals and out-patient departments and enable them to play a more efficient part in medical care. The time a patient spends in a hospital or an out-patient department is a mere fraction of his lifetime; he should therefore be seen on at least one occasion in his own environment. Hospital and domiciliary services should be closely integrated so that the work of one is complementary to the work of the other, hospital beds are used to the best advantage, the work load of the hospitals is reduced, and patients are more effectively followed up. It is more economical to care for some types of patients (for example, the aged and the chronic sick) at home. An efficient domiciliary health service could not only do this, it could also help improve home sanitation, impart health education, give practical advice on diet and personal hygiene, undertake deliveries at home where housing conditions are reasonably adequate, and look after the children afterwards. This work should be

carried out as far as possible with the active co-operation of general practitioners.

Health service records should be designed for simplicity and be used by all health units and health authorities. They would provide valuable health statistics, and serve as a guide to the planning of the further development of local health units. WHO is planning simple standardized forms for trial use by selected local health units in various parts of the world.

Technical supervision and assistance are needed to raise the standard of local health service. Specialists in both clinical medicine and public health should be available at intermediate and national levels. Public health laboratories, health education, maternal and child health, dental health, nutrition, mental health and other specialist services should be designated to assist the local services, their function being not merely to supervise or issue instructions but also to help apply modern medical and public health knowledge for the benefit of the people. They should also carry out field investigations in collaboration with the local health administration.

The Committee recommended the establishment of community health reference centres as scientific field laboratories for public health research. The primary reference centre, as it might be called, would deal with questions referred to it by health officers in the course of their daily work (the control of epidemics, for example, or epidemiological studies of various kinds); serve as a teaching centre and demonstration unit; and carry out field research in public health. It should cover a number of communities, of sufficient size to form a district where specialists could assist the local services, and have enough well-trained staff to carry out its routine functions and teach as well. A national reference centre should be staffed and equipped to undertake research into public health problems of greater technical complexity—problems that are beyond the scope of primary reference centres or are referred by them.

For assessing the progress of the health services year by year or measuring levels of health, health indicators would be ideal, but the work of the United Nations and WHO[3] shows that they are by no means easy to devise. Further studies should be made; perhaps the method of health survey used in the pilot studies might help, though each authority would need to adapt it to suit local conditions. In any case, the issue of an annual report by the local health officer would be a useful means of recording progress, and if the terms used in it were in common acceptation it would doubtless help achieve better understanding of the health situation in different countries and thus further international collaboration in health work.

[3] *Wld Hlth Org. techn. Rep. Ser.*, 1957, **137**

"The dire effect of [helminthic diseases] upon a rural nation was clearly brought home to me by a statement recently made by an American medical observer ... that the worms infesting the people of a certain semi-tropical country metabolize more of the produce of that country than do the inhabitants. Half the work of a sick peasantry, therefore, goes into the cultivation of food for the worms that make them sick."

Dr H. VAN ZILE HYDE, quoted in: Wagner, E. G. & Lanoix, J. N. (1958) *Excreta Disposal for Rural Areas and Small Communities* (*World Health Organization Monograph Series*, No. 39)

Notes and News

Leptospirosis in Latin America

Leptospirosis is very difficult to diagnose in tropical countries, where jaundice is common and is a symptom of not one but several conditions. Proof of the difficulty is the mistake made by Noguchi: he postulated an etiological relationship between yellow fever and leptospirosis, having found leptospirae in a proportion of the yellow fever patients he examined. This was indeed a mistake, but one fruitful in its consequences, for it drew attention to leptospirosis as a separate and individual disease. The serious kidney and liver symptoms of leptospirosis were long considered to be its characteristic symptoms, but then it was discovered that the disease may exist in an anicteric form—which complicates the diagnosis to no small degree. In man it may resemble influenza, dengue, rheumatic fever, Q fever or even typhoid fever. It should be kept in mind as a possible diagnosis in cases where the patient's occupation or hobbies bring him into contact with animals, or water or soil contaminated by animals.

Microscopic diagnosis of leptospirosis is not unequivocal: it is easy to mistake for leptospirae fibrin threads, fibrils or artefacts in the blood, urine or tissues. The microscopic-agglutination test is therefore to be preferred; this test is highly sensitive and specific, and its value is enhanced because antibodies persist in the blood for several years after infection. In areas where numerous serotypes may be present, it is necessary to employ multiple antigens.

Vast areas in Central and South America have a terrain, a climate, agricultural methods and an abundant fauna that may be ideally suited for the spread of leptospirosis in man and animals. However, systematic studies of its prevalence are few. What is its distribution in the various countries of Latin America and what species are found in them? In an article shortly to be published in the WHO Bulletin,[1] A. D. Alexander attempts an answer to these questions. More than 60 different serotypes have been described in the world, but only seven have been identified in Central America and five in South America. In the past, outbreaks or cases of leptospirosis were confused with yellow fever, especially in Ecuador, Mexico, Brazil and Peru. Most of the leptospirosis in Latin America has been attributed to the classical strain *Leptospira icterohaemorrhagiae*, which has been demonstrated in man and in rodents in Mexico, Costa Rica, Cuba, Puerto Rico, Jamaica, some of the islands of the Lesser Antilles, Brazil, Argentina, Chile, Paraguay, Uruguay, Ecuador, Venezuela, French Guiana and Surinam. A few human cases of *L. canicola* infection have been reported in Cuba, Puerto Rico, Jamaica, Argentina, Brazil and Uruguay. Outbreaks of *L. pomona* infection in man have been repeatedly shown in Argentina, and a case has been reported from Chile. A strain related to *L. kremastos* has been isolated from a human being in Jamaica. Six serotypes—*L. icterohaemorrhagiae*, *L. djatzi*, *L. ballum*, *L. grippotyphosa*, *L. alexi* and *L. borincana*—have been associated with human infections in Puerto Rico, a hyperendemic area of multiple leptospirosis. Recent serological surveys have uncovered foci of multiple leptospirosis affecting a large percentage of the human or animal population in some parts of Panama, Bolivia or Surinam, and there is evidence that other and perhaps new serotypes may be found in Latin America.

The significance of leptospirosis in domestic animals depends particularly on its relationship to human infections; in relatively few studies have there been observations on the disease in animals. Infections in dogs, caused in particular by *L. canicola* and *L. icterohaemorrhagiae*, have been reported from Cuba, Puerto Rico, Argentina and Brazil; there have also been cases of periodic ophthalmia in horses (the subject of etiological studies in Argentina and Brazil). An isolated instance of an outbreak of severe leptospirosis in cattle has been observed in Brazil. Infections in a large number of "normal" animals have been demonstrated in Argentina, where *L. pomona* was first isolated from swine and cattle and *L. hyos* from swine. Serological studies

[1] *Bull. Wld Hlth Org.*, 1960, 23 (In press)

there and in Puerto Rico, Mexico, Panama and Surinam have indicated a high prevalence in cattle. The true incidence of leptospirosis in Latin America can only be ascertained by properly applied laboratory diagnostic methods.

Gonococcal resistance to penicillin

Among venereologists and bacteriologists the disturbing news has been circulating for some years that the treatment of gonorrhoea with penicillin is only partially effective because of increasing resistance of the gonococcus to this antibiotic. Much work has indeed been published to show that some recently isolated strains of gonococcus tolerate doses of penicillin that would have destroyed all members of the species some fifteen years ago. Theoretically, of course, there is nothing surprising in this, for, ever since chemical substances have been used to prevent microbes from developing, microbes have met the challenge by evolving a multiplicity of ways and means of adapting themselves to the new situation.

To many venereologists gonococcal resistance has seemed to explain, at least in part, the epidemiological situation of gonorrhoea in the world. In spite of penicillin treatment (says the fifth report of the WHO Expert Committee on Venereal Infections and Treponematoses [1]) " the numbers of reported cases of gonorrhoea have remained virtually static or have increased—in some countries substantially ". In 15 out of 22 countries and territories reporting figures to WHO there has been a rise in numbers, and in another four the situation appears static. The annual incidence ranges from 10 to 50 per 10 000 inhabitants. Far from being a disease in regression, gonorrhoea is widespread, and in many parts of the world is one of the most challenging of health problems. Among the reasons for this are " increasing difficulties in the treatment and management of the disease ", while " lessened sensitivity—or resistance—to penicillin by the gonococcus may become a growing problem ".

An appeal for caution in the face of what may be over-hasty conclusions is, however, made by C. M. Carpenter in a critical analysis of the chief studies published on the subject, which will appear in a forthcoming number of the WHO Bulletin.[2] Dr Carpenter is Professor of Infectious Diseases, School of Medicine, University of California, Los Angeles, USA.

In Carpenter's view, evidence of resistance is unconfirmed, for those who adduce it have not always taken all the possible causes of error into account. These causes are enumerated and reviewed in turn. It must be certain that the infection combated is indeed due to the gonococcus, and therefore the micro-organism must be isolated and identified *in vitro*. The possibility of reinfection must be eliminated. The penicillin level must be adequate and maintained for a sufficient length of time. The action of penicillinase produced by other micro-organisms present—it has been shown to occur with *E. coli* in a case of gonococcal proctitis in the female—must also be excluded. It must be certain that the drug is fully active and has suffered no deterioration. The resistance of the gonococcus must be proved *in vitro*—and it must be remembered that the cultural characteristics of this bacterium make an evaluation of sensitivity tests difficult. It should also be borne in mind that gonococci, living within the cell, may be protected from the action of penicillin. They can live in closed foci and develop afresh if the foci re-open. They can remain inactive in unfavourable conditions and multiply when conditions again become favourable. In some persons the defence mechanisms against gonococci may be weakened. Immunological antagonism stimulated by a previous injection may result in inactivation of penicillin.

Lastly, diagnostic error cannot be excluded. Gonorrhoea should be clearly distinguished from other infections, particularly non-specific urethritis. Pleuro-pneumonia-like organisms have been isolated from some cases of this condition, and some authors regard these as developmental forms of the gonococcus. They are possibly associated micro-organisms which multiply when the gonococcus disappears and cause similar symptoms. These infections are common enough

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1960, 190

[2] *Bull. Wld Hlth Org.*, 1960, 23 (In press)

to be kept in mind while diagnosing gonorrhoea.

After reviewing the main laboratory studies on gonococcal resistance, Carpenter concludes that the amount of resistance shown by gonococcal cultures does not suffice to explain the way in which gradually resistant strains able to defy treatment are produced *in vivo*. We do not have as convincing data for the gonococcus as we have for other bacteria that are resistant to antibiotics.

Clinical evidence of gonococcal resistance is not irrefutable, if judged by strict standards. The possibility of a non-gonococcal secondary infection of the urethra or vagina continuing to develop after the disappearance of the gonococcus cannot be scouted. When symptoms of urethritis persist after antibiotic treatment, the causative organisms of these conditions must be sought before gonococcal resistance to penicillin is incriminated.

Sensitivity to primaquine

Of all the 8-aminoquinolines so far synthesized primaquine is the most active against relapses of *Plasmodium vivax* infections. Primaquine has been used successfully in the Korean War, and, given in combination with other antimalarials to troops crossing the Pacific, it has helped prevent malaria from being reintroduced into the USA. Its drawback is that, in the usual doses, it may cause haemolysis; this haemolysis is generally self-limited if the daily dose of the drug is not excessive, because newly formed cells entering the circulation are relatively resistant. Occasionally, when the drug is given in an excessive dosage the haemolytic effect may be severe.

In a paper shortly to be published in the WHO Bulletin [1] A. F. Alving et al., who since 1945 have been engaged in research into the 8-aminoquinolines, discuss various dosage schedules for these drugs in terms of this sensitivity phenomenon. Primaquine is not the only drug that causes haemolysis: so do compounds like naphthalene, acetanilide, some vitamin K derivatives and para-amino-salicylic acid (PAS), the clinical effects usually being mild. The ingestion of partly cooked broad beans, or even the inhalation of the pollen of the plant, may also cause haemolysis in persons who have the same genetic pattern of blood biochemical and enzyme abnormalities as is found in primaquine sensitivity; but broad-bean sensitivity is not always associated with primaquine sensitivity. This haemolytic sensitivity reaction occurs in certain ethnic groups: among North American negros, some groups of Jews, Sardinians, and Caucasians, for example. The inborn error of metabolism involved is characterized by a deficiency of glucose-6-phosphate dehydrogenase which affects the oxidation of glucose and certain other functions, and, it is suggested, may be the expression of a more fundamental but as yet unknown abnormality directly determined by a mutant gene. Complete expression of the genetic defect is common in affected males, affected females being usually heterozygous and experiencing less severe haemolysis.

The toxicity of primaquine is diminished if it is given once a week together with the standard suppressive dose of chloroquine or one of its equivalents. This dosage increases the effectiveness of the drug in the radical cure of vivax malaria. A weekly dose of 45 mg for 8 weeks proved to be highly effective against severe infections with the Chesson strain of *P. vivax*, curing 90% of the infections but producing no clinically demonstrable haemolysis in primaquine-sensitive adult males.

Various tests have been devised to find out what individuals are sensitive to primaquine, and most of them distinguish clearly between normal males and males susceptible to this kind of haemolysis. But up till now it has been difficult, if not impossible, to make this distinction in females, since most affected females have an intermediate susceptibility to haemolysis and extremely variable biochemical changes in their erythrocytes. In a paper following that of Alving et al. in the same issue of the Bulletin,[2] Brewer and his colleagues describe two modifications of a new, simple test called the methaemoglobin reduction test, based upon the oxidation of haemoglobin to methaemoglobin by sodium nitrite and subsequent enzymatic reconversion to haemoglobin in the presence of methylene blue.

[1] *Bull. Wld Hlth Org.*, 1960, 22 (In press)

[2] *Bull. Wld Hlth Org.*, 1960, 22 (In press)

This test has one essential advantage: it distinguishes, more accurately than any test hitherto empoyed, between females sensitive to primaquine and normal females with erythrocytic reactions. The simple modification of the test can be used in the field in general surveys. The more accurate modification requires a photoelectric colorimeter or a spectrophotometer, and is more suitable for laboratory use.

Malaria eradication in Europe

Preparations for the final eradication of malaria from the Continent of Europe within two years were discussed at a European Conference on Malaria Eradication held at Palermo, Sicily, from 31 March to 9 April 1960, under the auspices of the WHO Regional Office for Europe. The following countries were represented: Albania, Bulgaria, France (for Algeria), Greece, Italy, Morocco, the Netherlands, Portugal, Romania, Spain, Turkey, the USSR and Yugoslavia. About fifty malariologists participated.

Fifteen years ago no less than 276 million people in the European Region of WHO (including Algeria, Morocco, Turkey and the whole of the USSR) were exposed to malaria. Today, 59 million are still exposed—30 million of them on the Continent itself. Although malaria is receding rapidly because of the vigorous campaigns launched by health services, the next phase of operations in Europe will be both difficult and critical, involving the tracing and cure of the last cases before the disease can start spreading again. Of particular importance are the measures for preventing reinfection in the border areas of countries where malaria has already been eradicated. The problem of the co-ordination of national campaigns in North Africa, where the situation is less hopeful, was also reviewed.

Smallpox eradication in Cambodia

The first national smallpox eradication campaign in tropical Asia has been launched by the health authorities of Cambodia in co-operation with WHO. By the systematic vaccination over the next five years of its 4 600 000 inhabitants, it is hoped to eliminate the disease from the country completely. The cost of the campaign is estimated at less than $500 000. After successful mass vaccination, a comparatively small budget should suffice to maintain a state of immunity in the population. The eradication programme is being carried out within the framework of the world-wide smallpox eradication programme initiated by WHO, which is eventually expected to render the whole world safe from this disease.

The campaign has already started in the country's northern provinces, where 50 000 people have been vaccinated to date by WHO/UNICEF-assisted teams that are also engaged in the mass treatment of yaws. Vaccination or re-vaccination of 80% of the population within 4-5 years (generally accepted as essential for eradication) is particularly difficult to achieve in Cambodia, where an unknown number of "water nomads" roam the River Mekong and its tributaries, crossing freely into neighbouring countries. A further problem—that of climate—has, however, already been overcome by the development at the Pasteur Institute in Phnom-Penh of a freeze-dried vaccine that does not lose its potency in tropical conditions.

Dr D.K. Viswanathan

The death occurred in Madras, on 27 March, of Dr D. K. Viswanathan, senior WHO regional adviser for malaria in South-East Asia. Dr Viswanathan was the principal architect of WHO's antimalaria work in this region, where seven governments have launched extensive anti-malaria programmes. He was one of the world's leading malariologists and was among the first to see the potentialities of DDT in malaria control; it was during his term of office as Additional Director of Public Health (Malaria) in Bombay State (1943-1952) that India's first trials of DDT as a residual insecticide were carried out.

Dr Viswanathan was a graduate of Madras Medical College, an M.P.H. of Johns Hopkins University, Baltimore, Md, USA, and a fellow of the Indian Academy of Science in Bangalore. He began his career in public health in 1928 and served successively in the States of Madras, Assam and Bombay. In 1956, when he joined

WHO, he had served as Director of Public Health in Bombay State for four years.

Organizational changes at WHO Headquarters

The following changes in organizational structure at WHO Headquarters took effect on 11 April 1960.

The Division of Organization of Public Health Services was split into two divisions: the Division of Public Health Services, and the Division of Health Protection and Promotion. The distribution of units within the newly constituted divisions, both of which will, for the time being, remain under the direction of Dr J. S. Peterson, is as follows:

Division of Public Health Services: Office of the Director; Public Health Administration; Nursing; Health Education of the Public; Maternal and Child Health; Health Laboratory Services; Organization of Medical Care.

Division of Health Protection and Promotion: Office of the Director; Social and Occupational Health; Mental Health; Nutrition; Cancer; Cardiovascular Diseases; Dental Health.

Pending the appointment of a fourth Assistant Director-General, the Divisions of Public Health Services, of Health Protection and Promotion, and of Education and Training will report to the Deputy Director-General.

Programme Co-ordination and Programme Evaluation are henceforth attached to the Office of the Director-General.

People and Places

Bilharziasis foci in South-East Asia

The first autochthonous infection with *Schistosoma japonicum* in South-East Asia was reported in 1957 in the Mekong river valley, Laos, near the border of Thailand. A second case was reported in a patient from the district of Chawang in Southern Thailand in 1957, and a survey in a nearby village early in 1960 revealed about 200 cases of bilharziasis japonica.

The significance of these findings cannot be over-emphasized. For the first time endemic foci of the most dangerous of the three human schistosomes have been found in an area formerly thought to be free of the infection. Also the two foci are widely separated and in entirely different hydrographic basins. It is apparent that additional foci may occur in south-east Asia and that public health and medical authorities should be on the alert. The discovery of the parasite in the Mekong river basin is of particular importance, since extensive plans are being made for the development of the water and soil resources of the area.

Dr Y. Komiya, Chief of the Department of Parasitology, National Institute of Health, Tokyo, who has been appointed WHO consultant for a survey of the newly discovered foci, will investigate the epidemiological aspects of transmission, search for the molluscan intermediate host, and attempt to infect laboratory animals with the parasite from the area. His survey should be valuable to those responsible for economic development of the Mekong river basin, as a basis for incorporating snail control and other preventive measures into their plans.

Diarrhoeal Diseases Advisory Team

Dr Nina F. Blioumel, of the USSR, and Dr Richard H. Dobbs, of the United Kingdom, have joined the WHO Inter-Regional Diarrhoeal Diseases Advisory Team as bacteriologist and paediatric consultant respectively. Their first assignment is to carry out, in company with Dr Fred J. Payne, team leader and epidemiologist, intensive studies of diarrhoeal diseases in children in Mauritius, and possibly also in Swaziland and Basutoland.

Before joining WHO, Dr Blioumel carried out scientific research work at the first Moscow Medical Institute, where she also received her

post-graduate training in epidemiology. Dr Dobbs received his medical training at Cambridge and London, and has been Consulting Paediatrician to the London Hospital since 1936 and to the Queen Elizabeth Hospital for Children since 1938; between 1950 and 1952 he was a member of a working party of the Medical Research Council of Great Britain, which made controlled trials of various antibiotics in the treatment of infantile diarrhoea and vomiting.

Training of sanitary engineers

Mr Luis F. Mantilla, Chief Sanitary Engineer of the Ministry of Public Health, Peru, has been appointed WHO Visiting Professor of Sanitary Engineering at the American University of Beirut. He will help the university to develop its teaching programme in this field.

As a Fellow of the Rockefeller Foundation, Mr Mantilla studied sanitary engineering at Harvard University, and subsequently helped to plan and initiate sanitary engineering activities in Peru. Since 1946 he has been responsible for the co-ordination and supervision of the academic work of the Faculty of Sanitary Engineering at the National College of Engineering, Peru, of which he is Dean.

Virus diagnostic laboratories

Dr F. O. MacCallum, of the United Kingdom, is at present visiting Japan as WHO consultant to advise the public health authorities on the organization of virus diagnostic laboratories, and on the establishment of a co-ordinated network of such laboratories throughout the country, with the National Institute of Health of Tokyo as the centre. He will also advise on the organization of virus diagnostic training courses for technicians and doctors.

In addition, Dr MacCallum will visit Hong Kong to advise the health authorities on the establishment of a virus diagnostic service.

Dr MacCallum is Director of the Virus Reference Laboratory, Central Public Health Laboratory, London, England.

Rehabilitation of physically handicapped children

Dr P. Houssa has been appointed by WHO to advise the Government of Lebanon on the further development of a rehabilitation programme for handicapped children which was started in 1959 at the Institution Sociale d'Ouzai, Beirut, with help from the Organization.

Dr Houssa is Director of the Centre of Traumatology and Rehabilitation, Brussels, and is also a member of the WHO Expert Advisory Panel on Rehabilitation.

Public health laboratory service in Ghana

Dr C. C. Croft, Assistant Chief of Laboratories, Department of Health, Columbus, Ohio, USA, is spending three months in Ghana as WHO consultant in connexion with the development of a public health laboratory service. Dr Croft studied bacteriology at the University of Maryland, and obtained his D.Sc. at Johns Hopkins University, Baltimore, Md.

Headquarters appointment

Dr Petr Senov, of the USSR, has been appointed Director of the Division of Biology and Pharmacology at WHO Headquarters, replacing Dr Constantin Vinokouroff. Dr Senov is a graduate of Moscow State University and a Doctor of Pharmaceutical Sciences. He has held the Chair of Pharmaceutical Chemistry in the Faculty of Pharmacy of the First Moscow Medical Institute, and for many years headed the State Committee for the Pharmacopoeia of the USSR. He is a Member of the WHO Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations, and has served on the WHO Expert Committee on Specifications for Pharmaceutical Preparations.

Review of WHO Publications

Annual Epidemiological and Vital Statistics 1956, Geneva, 1959, 705 pages. Bilingual publication (English and French). Price: £3, $12.00, or Sw. fr. 36.—.

The ninth annual statistical report to be published by the World Health Organization sets out the demographic and health conditions of the countries of the world in 1956.

A study of the figures given in this report will acquaint the reader with the progress made in health throughout the world and will show him how great a task has still to be performed in vast areas despite recent advances in medical science and social organization. While in the more highly developed countries mortality and the frequency of infectious diseases continue to decrease, in other countries the increasingly complete statistical information becoming available reveals serious health problems which must still be faced.

This new annual report contains a number of innovations. In the first part, for instance, statistics of causes of death have been expanded. In the tables on causes of death figures have been given for deaths among young children by sex and by each year of age up to four years. A new table on the causes of infant mortality by age has been included. Among the other important subjects which have been either treated at greater length or newly introduced in this volume are cardiovascular diseases, malignant neoplasms, maternal mortality, and accidents according to the nature of injury.

In the second part of the volume seasonal statistics of notifiable communicable diseases are given, with the distribution by sex and by age for certain of these diseases.

The third part, which relates to statistics of health personnel, hospital establishments and vaccinations, has also been rearranged and extended. A distinction is made between physicians proper and other practitioners entitled to provide treatment under particular and prescribed conditions in certain territories of Africa, Asia and Oceania. The data also distinguish between private practitioners and physicians in the public health service. The number of inhabitants of each country or territory per physician is also given; the figures show vividly the still urgent need for medical personnel in certain areas of the world. Statistics of nursing and midwifery personnel have also been expanded.

Statistics on vaccinations cover six major communicable diseases. An attempt has been made, for the first time, to give details of the population groups vaccinated and of the units to which the figures refer (i.e., primary vaccination or revaccination).

Bibliography on Bilharziasis 1949-1958, Geneva, 1960, 158 pages. Bilingual publication (English and French). Price: 10/-, $2.00, or Sw. Fr. 6.—.

This bibliography of the world literature on bilharziasis covers material published between 1949 and 1958 and thus brings up to date two earlier bibliographies on the same subject.[1] In compiling it, the important medical reference sources have been systematically searched to make it as comprehensive as possible; a list of the principal sources consulted, apart from the indexes and catalogues of the WHO Library, is included. In a few cases it was not possible to obtain the original material and the reference cited has therefore not been verified. The 2827 references are arranged alphabetically by author. A combined subject and geographical index in English and French appears at the end of the bibliography, referring to the item numbers.

Guide to Hygiene and Sanitation in Aviation, Geneva, 1960, 51 pages. Price: 3/6, $0.60, or Sw. fr. 2.—. Also published in French and Spanish.

This booklet is a reprint of the annex to the first report of the WHO Expert Committee on Hygiene and Sanitation in Aviation (*World Health Organization Technical Report Series*, 1959, **174**). It is reviewed at length in an article on page 219 of this number of the Chronicle.

[1] Khalil, M. (1931) *The bibliography of schistosomiasis (bilharziasis), zoological, clinical and prophylactic*, Cairo, Egyptian University; Bouillon, A. (1950) *Bibliographie des schistosomes et des schistosomiases (bilharzioses) humaines et animales de 1931 à 1948*, Bruxelles, Institut Royal Colonial Belge

International Non-Proprietary Names for Pharmaceutical Preparations

In accordance with paragraph 3 of the Procedure for the Selection of Recommended International Non-Proprietary Names for Pharmaceutical Preparations,[1] notice is hereby given that the following names are under consideration by the World Health Organization as proposed international non-proprietary names.

Comments on, or formal objections to, the proposed names may be forwarded by any person to the Secretary, Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations, World Health Organization, within four months from 1 June 1960.

The inclusion of a name in the lists of proposed international non-proprietary names does not imply any recommendation for the use of the substance in medicine or pharmacy.

PROPOSED INTERNATIONAL NON-PROPRIETARY NAMES (*Prop. I.N.N.*): LIST 10 [2]

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
acidum thyropropicum thyropropic acid	3-[4-(4-hydroxy-3-iodophenoxy)- 3,5-diodophenyl]propionic acid
allylestrenolum allylestrenol	17α-allylestr.-4-en-17-ol
aminoglutethimidum aminoglutethimide	2-(*p*-aminophenyl)-2-ethylglutarimide
amphenidonum amphenidone	1-(*m*-aminophenyl)-2[*1*H] pyridone
amphotericinum B amphotericin B	a polyene antibiotic substance obtained from cultures of *Streptomyces nodosus*, or the same substance produced by any other means
androstanazolum androstanazole	17β-hydroxy-17α-methylandrostano-[3, 2-*c*] pyrazole
anisindionum anisindione	2-*p*-methoxyphenylindane-1,3-dione
benzthiazidum benzthiazide	3-benzylthiomethyl-6-chloro-7-sulfamoybenzo-1,2,4(*4H*)-thiadiazine 1,1-dioxide
biperidenum biperiden	1-(bicyclo[2,2,1] hept-5-en-2-yl)-1-phenyl-3-piperidinopropanol
bretylii tosylas bretylium tosylate	*N-o*-bromobenzyl-*N*-ethyl-*N,N*-dimethylammonium tosylate (tosylic acid is *p*-toluenesulfonic acid)
bunamiodylum bunamiodyl	3-(3-butyramido-2,4,6-triiodophenyl)-2-ethylacrylate

[1] See Annex 1, page 249.

[2] Other lists of proposed international non-proprietary names can be found in *Chron. Wld Hlth Org.*, 1953, **7**, 297; 1954, **8**, 216, 313; 1956, **10**, 28; 1957, **11**, 231; 1958, **12**, 102; *WHO Chronicle*, 1959, **13**, 105, 152; 1960, **14**, 168.

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
butadiazamidum butadiazamide	*N*-(5-butyl-1,3,4-thiadiazol-2-yl)-*p*-chlorobenzenesulfonamide
calcii benzamidosalicylas calcium benzamidosalicylate	calcium 4-benzamido-2-hydroxybenzoate
calcii carbimidum calcium carbimide	calcium cyanamide
carisoprodolum carisoprodol	2-carbamoyloxymethyl-2-isopropylcarbamoyloxymethylpentane
chlorphenoxaminum chlorphenoxamine	2-(1-*p*-chlorophenyl-1-phenylethoxy) ethyldimethylamine
chlorprothixenum chlorprothixene	*trans*-2-chloro-9-(3-dimethylaminopropylidene) thiaxanthen
chlorthenoxazinum chlorthenoxazine	2-(2-chloroethyl)-2,3-dihydro-4-oxobenz-1,3-oxazine
chymotrypsinum chymotrypsin	an enzyme, α-chymotrypsin, obtained in crystalline form from mammalian pancreas by aqueous acid extraction of its proenzyme, chymotrypsinogen, and subsequent conversion with trypsin to chymotrypsin
cinnamaverinum cinnamaverine	2-diethylaminoethyl 2-phenylcinnamate
colistinum colistin	an antibiotic substance obtained from cultures of *Aerobacillus colistinus*, or the same substance produced by any other means
cyclophosphamidum cyclophosphamide	*N*,*N*-bis(2-chloroethyl)-*N'*-(3-hydroxypropyl) phosphordiamidic acid cyclic ester
cyproheptadinum cyproheptadine	4-(5-dibenzo[*a*-*e*]cycloheptatrienylidene)-1-methylpiperidine
demecarii bromidum demecarium bromide	*N*,*N'*-decamethylenebis-{trimethyl(3-*N*-methylcarbamoyloxyphenyl) ammonium bromide}
demethylchlortetracyclinum demethylchlortetracycline	7-chloro-4-dimethylamino-1,4,4a,5,5a,6,11,12a-octahydro-3,6,10,12, 12a-pentahydroxy-1,11-dioxo-2-naphthacenecarboxamide
dexbrompheniraminum dexbrompheniramine	(+)-(3-*p*-bromophenyl-3-pyrid-2'-ylpropyl) dimethylamine
dexchlorpheniraminum dexchlorpheniramine	(+)-(3-*p*-chlorophenyl-3-pyrid-2'-ylpropyl) dimethylamine
diampromidum diampromide	*N*-{2-[(methyl)phenethylamino]-propyl}propionanilide
dichlorisonum dichlorisone	9α-11β-dichloro-17α-hydroxypregna-1,4-diene-3,20-dione
dieldrinum dieldrin	product containing 85 per cent. of 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-*exo*-1,4-*endo*-5,8-dimethanonaphthalene
dimeprozanum dimeprozane	9-(3-dimethylaminopropylidene)-2-methoxyxanthene
dimethizolinum dimethizoline	1-(2-methoxyphenyl)-4-(3-methoxypropyl) piperazine
diphenoxylatum diphenoxylate	1-(3-cyano-3, 3-diphenylpropyl)-4-phenylpiperidine-4-carboxylic acid ethyl ester

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
dipiproverinum dipiproverine	2-piperidinoethyl α-phenyl-α-piperidinoacetate
ditophalum ditophal	diethyl dithioisophthalate
emylcamatum emylcamate	1-ethyl-1-methylpropyl carbamate
ethenzamidum ethenzamide	*o*-ethoxybenzamide
ethionamidum ethionamide	2-ethylpyridine-4-carbothionamide
ferrocholinatum ferrocholinate	a chelate prepared by reacting equimolar quantities of freshly precipitated ferric hydroxide with choline dihydrogen citrate
fibrinolysinym (humanum) fibrinolysin (human)	an enzyme obtained from human plasma by conversion of profibrinolysin with streptokinase to fibrinolysin
flumethiazidum flumethiazide	6-trifluoromethyl-7-sulfamoylbenzo-1,2,4(*4H*)-thiadiazine 1,1-dioxide
fluphenazinum fluphenazine	10-{3-[4-(2-hydroxyethyl)piperazin-1-yl]propyl}-2-trifluoromethylphenothiazine
glucagonum glucagon	polypeptide consisting of 29 amino acid residues which would possess a minimum molecular weight of 3482
griseofulvinum griseofulvin	7-chloro-4,6-dimethoxycoumaran-3-one-2-spiro-1′-(2′-methoxy-6′-methylcyclohex-2′-en-4′-one)
halopenii chloridum halopenium chloride	4-bromobenzyl-3-(4-chloro-5-methyl-2-isopropyl-phenoxy)propyldimethylammonium chloride
haloperidolum haloperidol	4-(*p*-chlorophenyl)-1-[3-(*p*-fluorobenzoyl)propyl]piperidin-4-ol
hexapropymatum hexapropymate	1-prop-2′-ynylcyclohex-1-yl carbamate
hexcarbacholini bromidum hexcarbacholine bromide	*N N′*-hexamethylenebis[(2-carbamoyloxyethyl)trimethylammonium bromide]
homochlorcyclizinum homochlorcyclizine	1-(*p*-chlorodiphenylmethyl)-4-methyl-1,4-diazacycloheptane
hydrargaphenum hydrargaphen	phenylmercuric methylenebis (2-naphthyl-3-sulfonate)
hydrochlorothiazidum hydrochlorothiazide	6-chloro-3,4-dihydro-7-sulfamoylbenzo-1,2,4-thiadiazine dioxide-1,1
hydroflumethiazidum hydroflumethiazide	3,4-dihydro-6-trifluoromethyl-7-sulfamoylbenzo-1,2,4-thiadiazine 1,1 dioxide
hydroxindasatum hydroxindasate	5-acetoxy-3-(2-aminoethyl)-1-(*p*-methoxybenzyl)-2-methylindole
hydroxystenozolum hydroxystenozole	17 β-hydroxy-17α-methylandrost-4 eno-[3,2-*c*]pyrazole
kanamycinum kanamycin	an antibiotic substance obtained from cultures of *Streptomycis kanamyceticus* or the same substance produced by any other means
levisoprenalinum levisoprenaline	1-(3,4-dihydroxyphenyl)-2-isopropylaminoethanol

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
mebhydrolinum mebhydrolin	5-benzyl-1,2,3,4-tetrahydro-2-methylpyrid[4,3-*b*] indole
medroxyprogesteroni acetas medroxyprogesterone acetate	17 α-acetoxy-6α-methylpregn-4-ene-3,20-dione
mepenzolate bromidum mepenzolate bromide	1-methyl-3-piperidyl benzilate methylbromide
mephenoxalonum mephenoxalone	5-(*o*-methoxyphenoxymethyl)-2-oxazolidinone
mestanolonum mestanolone	17 β-hydroxy-17-methyl-5α-androstan-3-one
metahexamidum metahexamide	*N*-(*m*-amino-*p*-methylbenzenesulfonyl)-*N'*-cyclohexylurea
methaqualonum methaqualone	2-methyl-3-*o*-tolyl-4-quinazolone
methazolamidum methazolamide	5-acetylimino-4-methyl-1,3,4-thiadiazoline-2-sulfonamide
methdilazinum methdilazine	10-(1-methyl-3-pyrrolidinylmethyl)phenothiazine
methotrexatum methotrexate	4-amino-10-methylpteroylglutamic acid
methylchromonum methylchromone	3-methylchromone
natrii carbazochromi sulfonas carbazochrome sodium sulfonate	sodium 2,3,5,6-tetrahydro-1-methyl-6-oxo-5-semicarbazonoindole-3-sulfonate
natrii hexacyclonas sodium hexacyclonate	sodium 1-hydroxymethylcyclohexylacetate
nialamidum nialamide	*N*-isonicotinoyl-*N'*-(β-*N*-benzylcarboxamidoethyl) hydrazine
nicothiazonum nicothiazone	nicotinaldehyde thiosemicarbazone
nifurethazonum nifurethazone	5-nitrofuraldehyde 2-(2-dimethylaminoethyl) semicarbazone
nihydrazonum nihydrazone	5-nitro-2-furaldehyde acetylhydrazone
norvinisteronum norvinisterone	17 β-hydroxy-17α-vinylestr-4-en-3-one
octatropini methylbromidum octatropine methylbromide	*N*-methyl-0-(2-propylpentanoyl) tropinium bromide
oxyphencycliminum oxyphencyclimine	(1,4,5,6-tetrahydro-1-methyl-2-pyrimidinyl)methyl α-cyclohexyl-α-phenylglycolate
palmidrolum palmidrol	*N*-(2-hydroxyethyl)palmitamide
paronomycinum paronomycin	an antibiotic substance obtained from cultures of certain *streptomyces* species, one of which is *streptomyces rimosus*, or the same substance produced by any other means
penicillinasum penicillinase	an enzyme obtained by fermentation from cultures of *B. Cereus*

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
pentapiperidum pentapiperide	1-methylpiperid-4-yl 3-methyl-2-phenylvalerate
phanquinonum phanquinone	4,7-phenanthroline-5,6-quinone
phenampromidum phenampromide	*N*-{2-(1-methylpiperid-2-yl)ethyl}propionanilide
phenelzinum phenelzine	β-phenethylhydrazine
phenformininum phenformin	N^1 phenethylbiguanide
phenglutarimidum phenglutarimide	α-2-diethylaminoethyl-α-phenylglutarimide
phenprobamatum phenprobamate	3-phenylpropyl carbamate
phetharbitalum phetharbital	5,5-diethyl-1-phenylbarbituric acid
phytonadioli natrii diphosphas phytonadiol sodium diphosphate	2-methyl-3-phytyl-1,4-naphtalene di(sodium hydrogen phosphate)
pipamazinum pipamazine	10-[3-(4-carbamoylpiperidino)propyl]-2-chlorophenothiazine
pipethanatum pipethanate	2-piperidinoethyl benzilate
polycarbophilum polycarbophil	a synthetic, loosely crosslinked, hydrophilic resin of the polycarboxylic type
pralidoximi methiodidum pralidoxime methiodide	2-pyridine aldoxime methiodide
procainum procaine	β-diethylaminoethyl 4-aminobenzoate
promethazini theoclas promethazine theoclate	10-(2-dimethylaminopropyl)phenothiazine salt of 8-chlorotheophylline
propyli docetrizoas propyl docetrizoate	propyl 3-diacetylamino-2,4,6-triiodobenzoate
prothixenum prothixene	9-(3-dimethylaminopropylidene)thiaxanthen
protokylolum protokylol	1-(3,4-dihydroxyphenyl)-2-(α-methyl-3,4-methylenedioxyphenethyl-amino)ethanol
proxyphyllinum proxyphylline	7-2′-hydroxypropyltheophylline
styramatum styramate	2-hydroxyphenethyl carbamate
sulfachlorpyridazinum sulfachlorpyridazine	6-chloro-3-sulfanilamido pyridazine
sulfadimethoxinum sulfadimethoxine	2,4-dimethoxy-6-sulfanilamido pyrimidine
sulfaphenazolum sulfaphenazol	1-phenyl-5 sulfanilamido pyrazole

Proposed International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
sulfasomizolum sulfasomizol	3-methyl-5-sulfanilamido isothiazole
sulfatolamidum sulfatolamide	1-sulfanilylthiourea salt of *p*-sulfamoylbenzylamine
syrosingopinum syrosingopine	4-ethoxycarbonyl-3,5-dimethoxybenzoic acid ester of methyl reserpate
thiamphenicolum thiamphenicol	D(+)*threo*-2-dichloracetamido-1-(*p*-methylsulfonylphenyl)propane-1.3-diol
thihexinoli methylbromidum thihexinol methylbromide	*trans*-α,α-(dithien-2-yl)-(4-dimethylaminocyclohexyl) carbinol methylbromide
thioproperazinum thioproperazine	*N,N*-dimethyl-10-[3-(4-methylpiperazin-1-yl)propyl]-2-phenothiazine-sulfonamide
thiotepa thiotepa	*N′,N″,N‴*-triethylenethiophosphoramide
toloxychlorinolum toloxychlorinol	1,1′-[(3-*o*-tolyloxypropylene)dioxy]bis(2,2,2,-trichloroethanol)
triclazatum triclazate	1-methyl-3-pyrrolidinylmethyl benzilate
triclobisonii chloridum triclobisonium chloride	hexamethylenebis[dimethyl{1-methyl-3-(2,2,6-trimethylcyclohexyl) propyl}ammonium chloride] hemihydrate
trifluoperazinum trifluoperazine	2-trifluomethyl-10-[3-(1-methyl-4 piperazinyl) propyl]phenothiazine
triflupromazinum triflupromazine	2-trifluoromethyl-10-(3-dimethylaminopropyl) phenothiazine
trimethobenzamidum trimethobenzamide	*N*-(*p*-2-dimethylaminoethoxybenzyl)-3,4,5-trimethoxybenzamide
trolnitratum trolnitrate	triethanolamine trinitrate

Annex 1

PROCEDURE FOR THE SELECTION OF RECOMMENDED INTERNATIONAL NON-PROPRIETARY NAMES FOR PHARMACEUTICAL PREPARATIONS *

The following procedure shall be followed by the World Health Organization in the selection of recommended international non-proprietary names for pharmaceutical preparations, in accordance with the World Health Assembly resolution WHA3.11:

1. Proposals for recommended international non-proprietary names shall be submitted to the World Health Organization on the form provided therefor.

2. Such proposals shall be submitted by the Director-General of the World Health Organization to the members of the Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations designated for this purpose, for consideration in accordance with the " General principles for guidance in devising International Non-proprietary Names ", appended to this procedure.[1] The name used by the person discovering or first developing and marketing a pharmaceutical preparation shall be accepted, unless there are compelling reasons to the contrary.

* Text adopted by the Executive Board in resolution EB15.R7 (*Off. Rec. Wld Hlth Org.*, 1955, **60**, 3)

[1] See Annex 2, page 251.

3. Subsequent to the examination provided for in article 2, the Director-General of the World Health Organization shall give notice that a proposed international non-proprietary name is being considered.

A. Such notice shall be given by publication in *WHO Chronicle* and by letter to Member States and to national pharmacopoeia commissions or other bodies designated by Member States.

(i) Notice may also be sent to specific persons known to be concerned with a name under consideration.

B. Such notice shall:

(i) set forth the name under consideration;

(ii) identify the person who submitted a proposal for naming the substance, if so requested by such person;

(iii) identify the substance for which a name is being considered;

(iv) set forth the time within which comments and objections will be received and the person and place to whom they should be directed;

(v) state the authority under which the World Health Organization is acting and refer to these rules of procedure.

C. In forwarding the notice, the Director-General of the World Health Organization shall request that Member States take such steps as are necessary to prevent the acquisition of proprietary rights in the proposed name during the period it is under consideration by the World Health Organization.

4. Comments on the proposed name may be forwarded by any person to the World Health Organization within four months of the date of publication, under article 3, of the name in *WHO Chronicle*.

5. A formal objection to a proposed name may be filed by any interested person within four months of the date of publication, under article 3, of the name in *WHO Chronicle*.

A. Such objection shall:

(i) identify the person objecting;

(ii) state his interest in the name;

(iii) set forth the reasons for his objection to the name proposed.

6. Where there is a formal objection under article 5, the World Health Organization may either reconsider the proposed name or use its good offices to attempt to obtain withdrawal of the objection. Without prejudice to the consideration by the World Health Organization of a substitute name or names, a name shall not be selected by the World Health Organization as a recommended international non-proprietary name while there exists a formal objection thereto filed under article 5 which has not been withdrawn.

7. Where no objection has been filed under article 5, or all objections previously filed have been withdrawn, the Director-General of the World Health Organization shall give notice in accordance with subsection A of article 3 that the name has been selected by the World Health Organization as a recommended international non-proprietary name.

8. In forwarding a recommended international non-proprietary name to Member States under article 7, the Director-General of the World Health Organization shall:

A. request that it be recognized as the non-proprietary name for the substance; and

B. request that Member States take such steps as are necessary to prevent the acquisition of proprietary rights in the name, including prohibiting registration of the name as a trade-mark or trade-name.

Annex 2

GENERAL PRINCIPLES FOR GUIDANCE IN DEVISING INTERNATIONAL NON-PROPRIETARY NAMES

1. Names should, preferably, be free from any anatomical, physiological, pathological or therapeutic suggestion.

2. An attempt should first be made to form a name by the combination of syllables in such a way as to indicate the significant chemical groupings of the compound and/or its pharmacological classification. Preference should be given to the following syllables:

Latin	*English*	*French*	
inum	ine	ine	for alkaloids and organic bases
olum	ol	ol	for alcohols and phenols (-OH group)
alum	al	al	for aldehydes
onum	one	one	for ketones and other substances containing the CO group
enum	ene	ène	for unsaturated hydrocarbons
anum	ane	ane	for saturated hydrocarbons
cainum	caine	caïne	for local anaesthetics of the procaine type
mer	mer	mer	for mercurial compounds
sulfonum	sulfone	sulfone	for sulfone derivatives
quinum	quine	quine	for antimalarial substances containing a quinoline group
crinum	crine	crine	for antimalarial substances containing an acridine group
sulfa	sulfa	sulfa	for derivatives of sulfanilamide having an antibacterial action
dionum	dione	dione	for anti-epileptics derived from oxazolidinedione
toinum	toin	toïne	for anti-epileptics derived from hydantoin
stigminum	stigmine	stigmine	for anticholinesterases of the physostigmine (eserine) type.

3. Names should be distinctive in sound and spelling. They should not be inconveniently long and should not be liable to confusion with names already in use.

4. The addition of a terminal capital letter or number should be avoided as far as possible.

5. Names proposed by the person discovering or first developing and marketing a pharmaceutical preparation, or already officially adopted in any country, or used in national pharmacopoeias, or in works of reference such as " New and Non-official Drugs ", should receive preferential consideration.

6. Cognizance should be taken of the names of closely related substances and, where desirable, the name should show this relationship.

BULLETIN

OF
THE WORLD HEALTH ORGANIZATION

DE
L'ORGANISATION MONDIALE DE LA SANTÉ

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International Reference Preparation for Human Menopausal Gonadotrophin—*Department of Biological Standards, National Institute for Medical Research, London*

Intermediate hosts of *Schistosoma* in Africa: some recent information—*G. Mandahl-Barth*

Notes

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